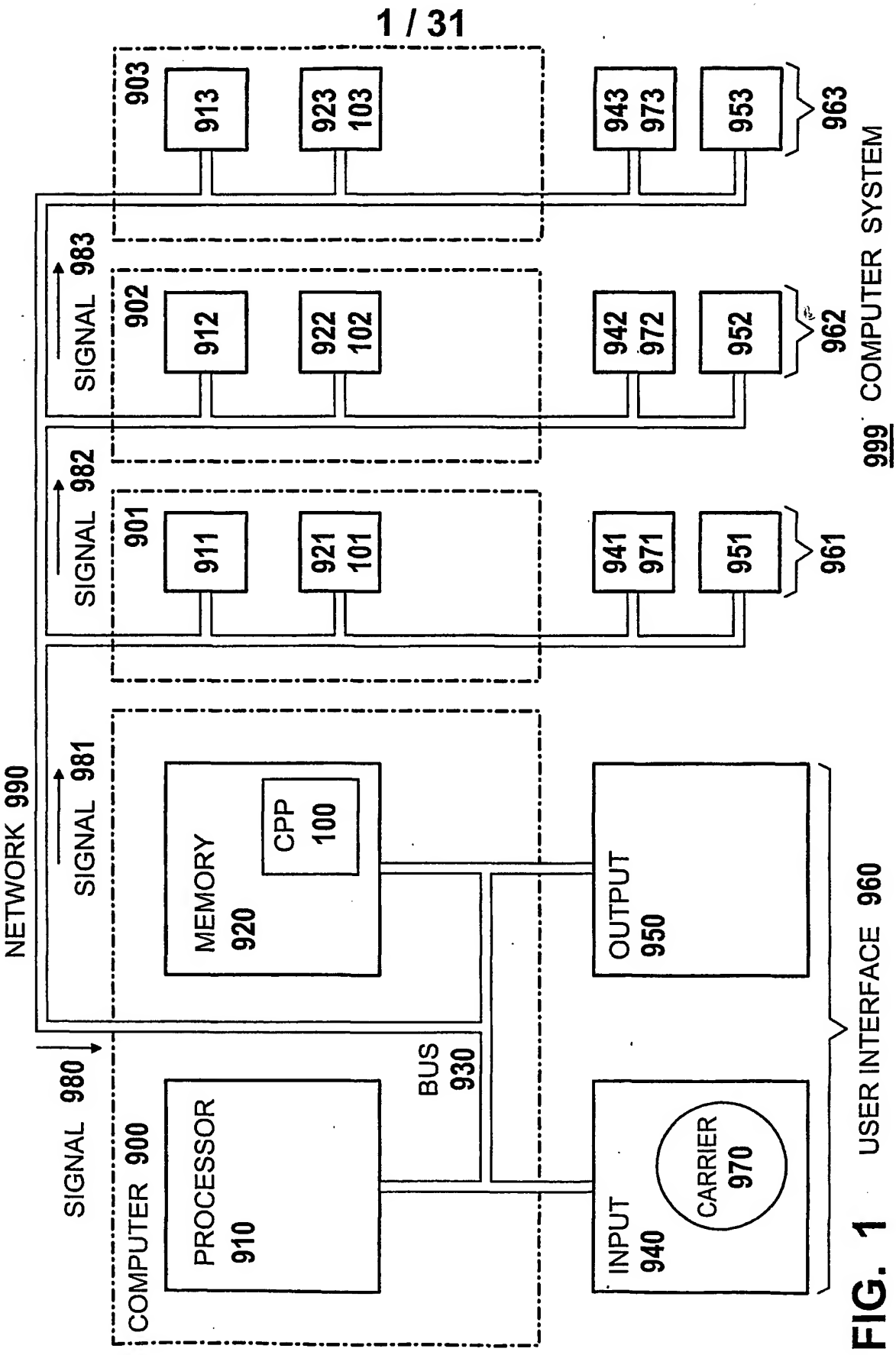
NETWORK 990
SIGNAL 981
SIGNAL 982
SIGNAL 983
SIGNAL 980
COMPUTER 900
PROCESSOR 910
BUS 930
MEMORY 920
CPP 100
INPUT 940
CARRIER 970
OUTPUT 950
USER INTERFACE 960
903
913
923 103
943 973
953
963
902
912
922 102
942 972
952
962
901
911
921 101
941 971
951
961
999 COMPUTER SYSTEM

FIG. 1

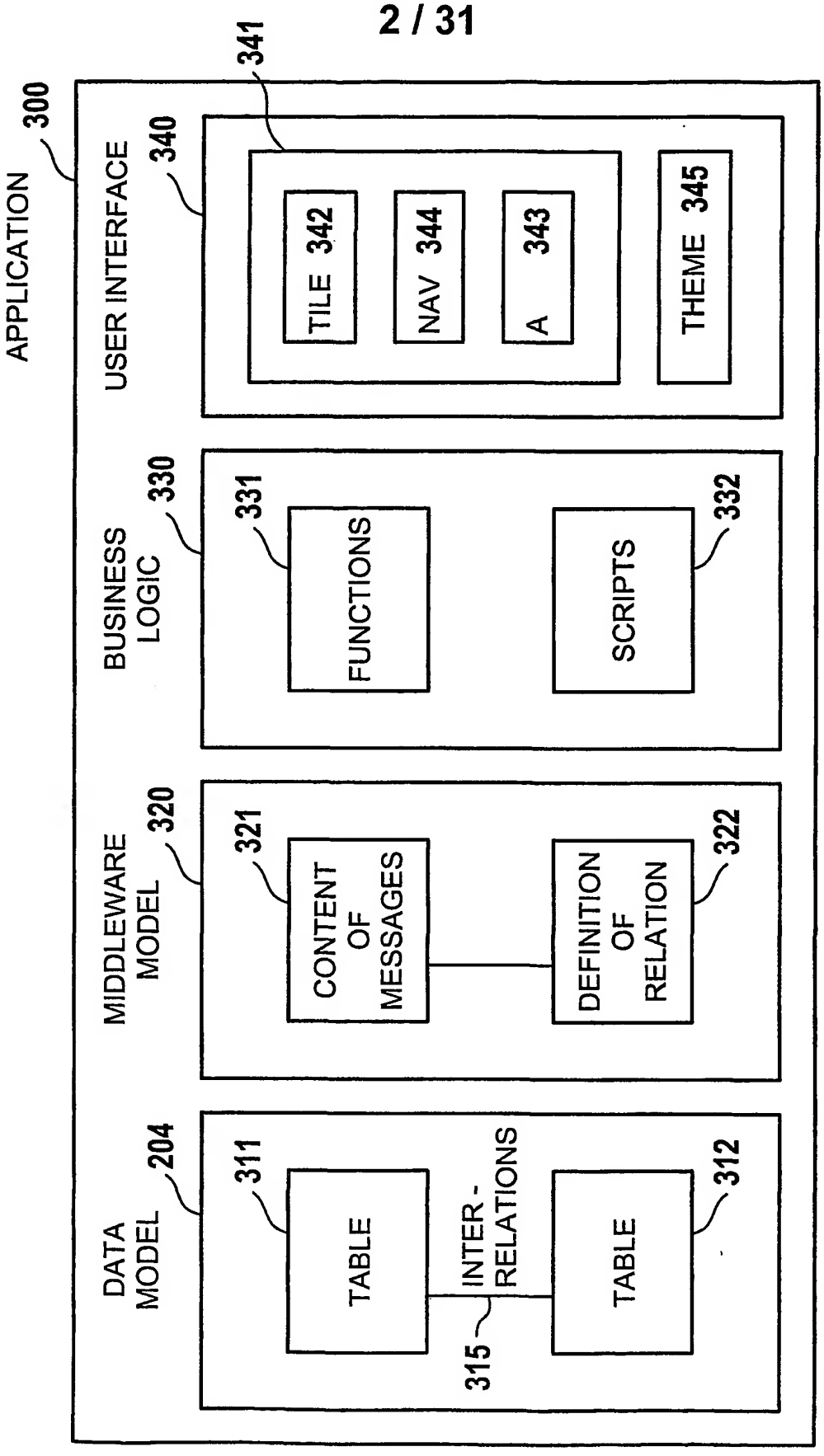
APPLICATION
300
USER INTERFACE
340
341
TILE 342
NAV 344
A 343
THEME 345
BUSINESS LOGIC
330
331
FUNCTIONS
SCRIPTS
332
MIDDLEWARE MODEL
320
321
CONTENT OF MESSAGES
DEFINITION OF RELATION
322
DATA MODEL
204
311
TABLE
INTER-RELATIONS
315
TABLE
312

FIG. 2

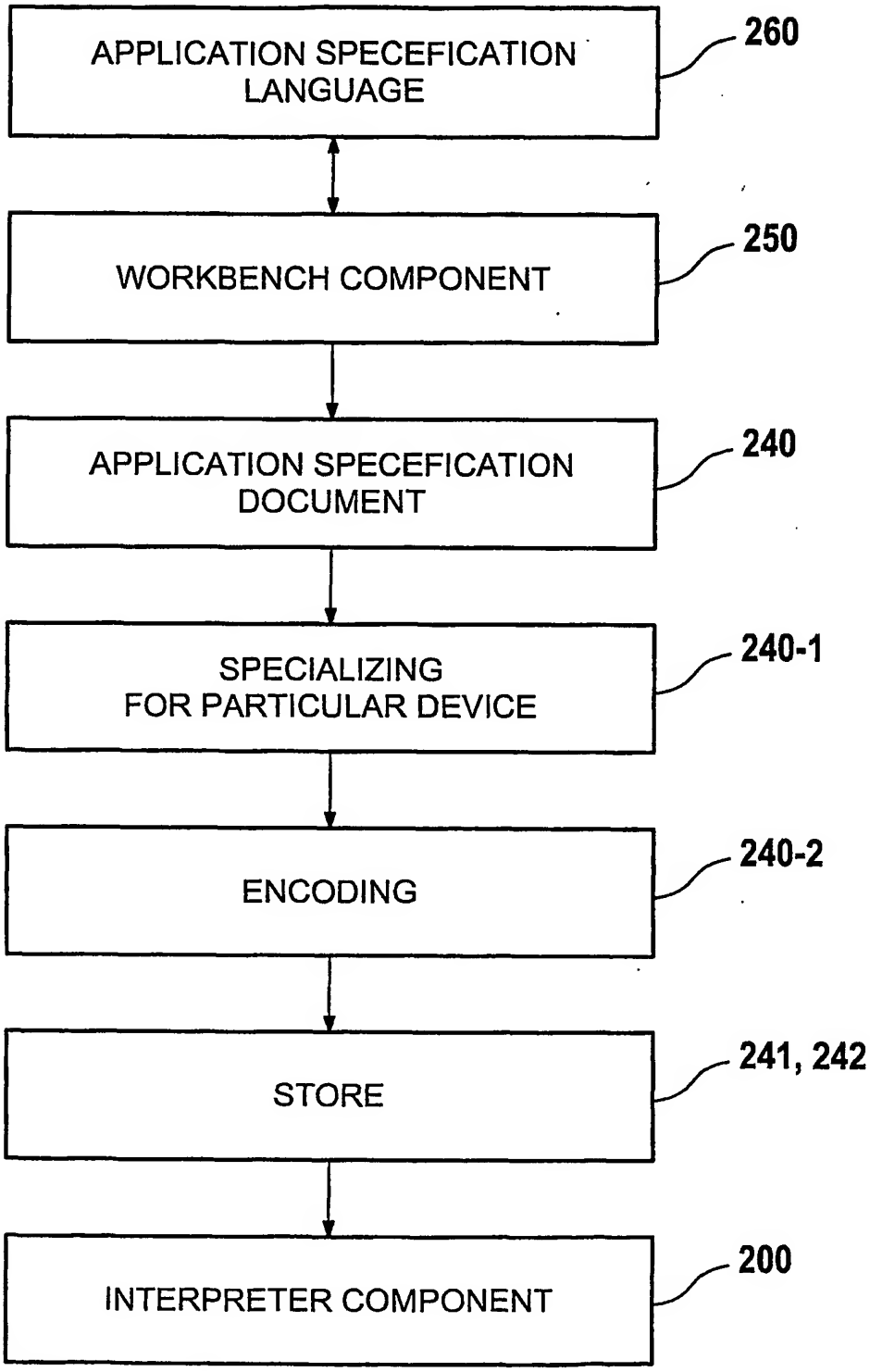
APPLICATION SPECEFICATION LANGUAGE
260
WORKBENCH COMPONENT
250
APPLICATION SPECEFICATION DOCUMENT
240
SPECIALIZING FOR PARTICULAR DEVICE
240-1
ENCODING
240-2
STORE
241, 242
INTERPRETER COMPONENT
200

FIG. 3

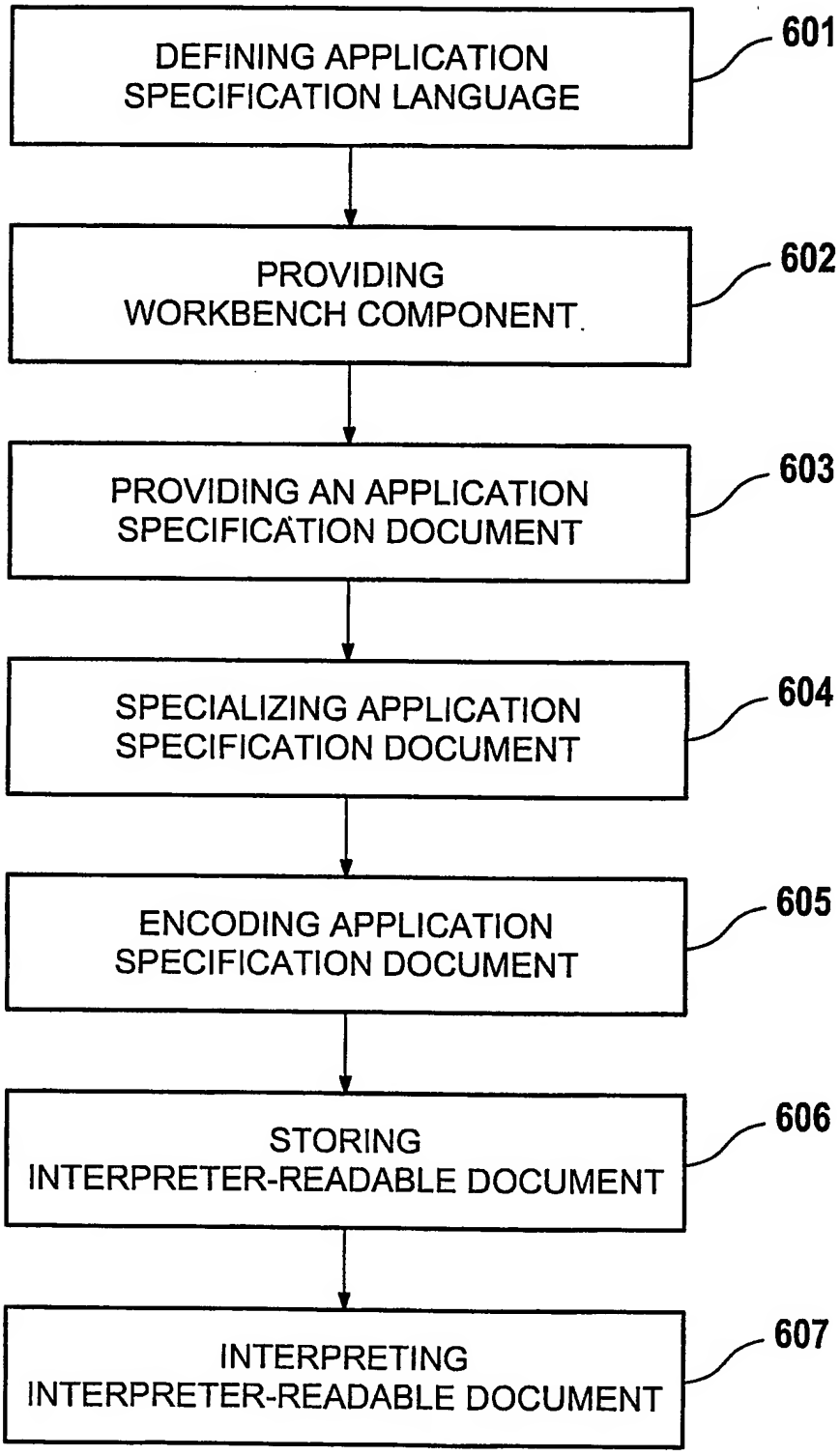
DEFINING APPLICATION SPECIFICATION LANGUAGE
601
PROVIDING WORKBENCH COMPONENT
602
PROVIDING AN APPLICATION SPECIFICATION DOCUMENT
603
SPECIALIZING APPLICATION SPECIFICATION DOCUMENT
604
ENCODING APPLICATION SPECIFICATION DOCUMENT
605
STORING INTERPRETER-READABLE DOCUMENT
606
INTERPRETING INTERPRETER-READABLE DOCUMENT
607

FIG. 4

600

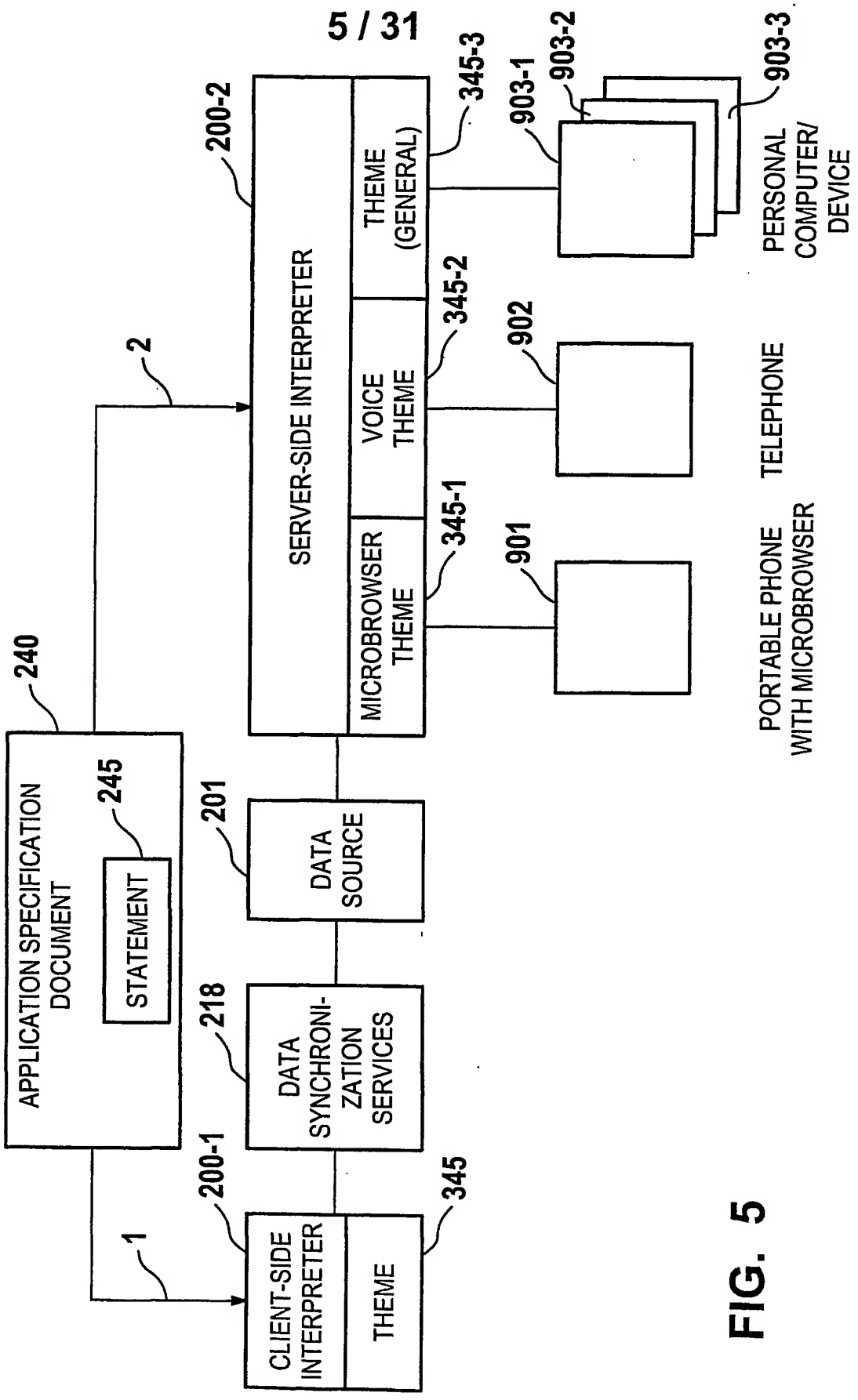
240
APPLICATION SPECIFICATION DOCUMENT
245
STATEMENT
2
1
200-2
SERVER-SIDE INTERPRETER
THEME (GENERAL)
VOICE THEME
MICROBROWSER THEME
345-3
345-2
345-1
903-1
903-2
903-3
902
901
PERSONAL COMPUTER/ DEVICE
TELEPHONE
PORTABLE PHONE WITH MICROBROWSER
201
DATA SOURCE
218
DATA SYNCHRONI-ZATION SERVICES
200-1
CLIENT-SIDE INTERPRETER
THEME
345

FIG. 5

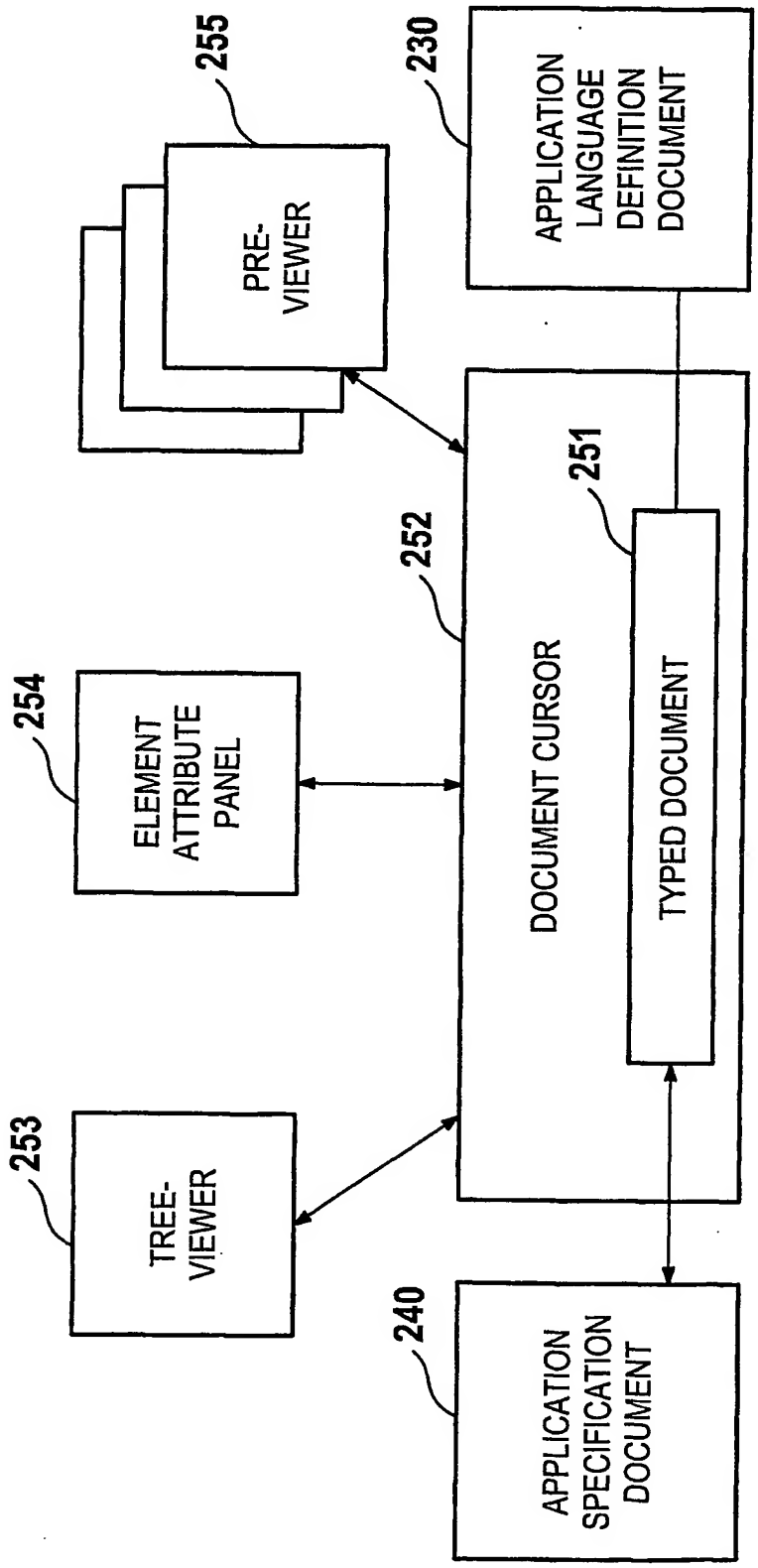
255
PRE-VIEWER
230
APPLICATION LANGUAGE DEFINITION DOCUMENT
251
252
DOCUMENT CURSOR
TYPED DOCUMENT
254
ELEMENT ATTRIBUTE PANEL
253
TREE-VIEWER
240
APPLICATION SPECIFICATION DOCUMENT
WORKBENCH COMPONENT
250

FIG. 6

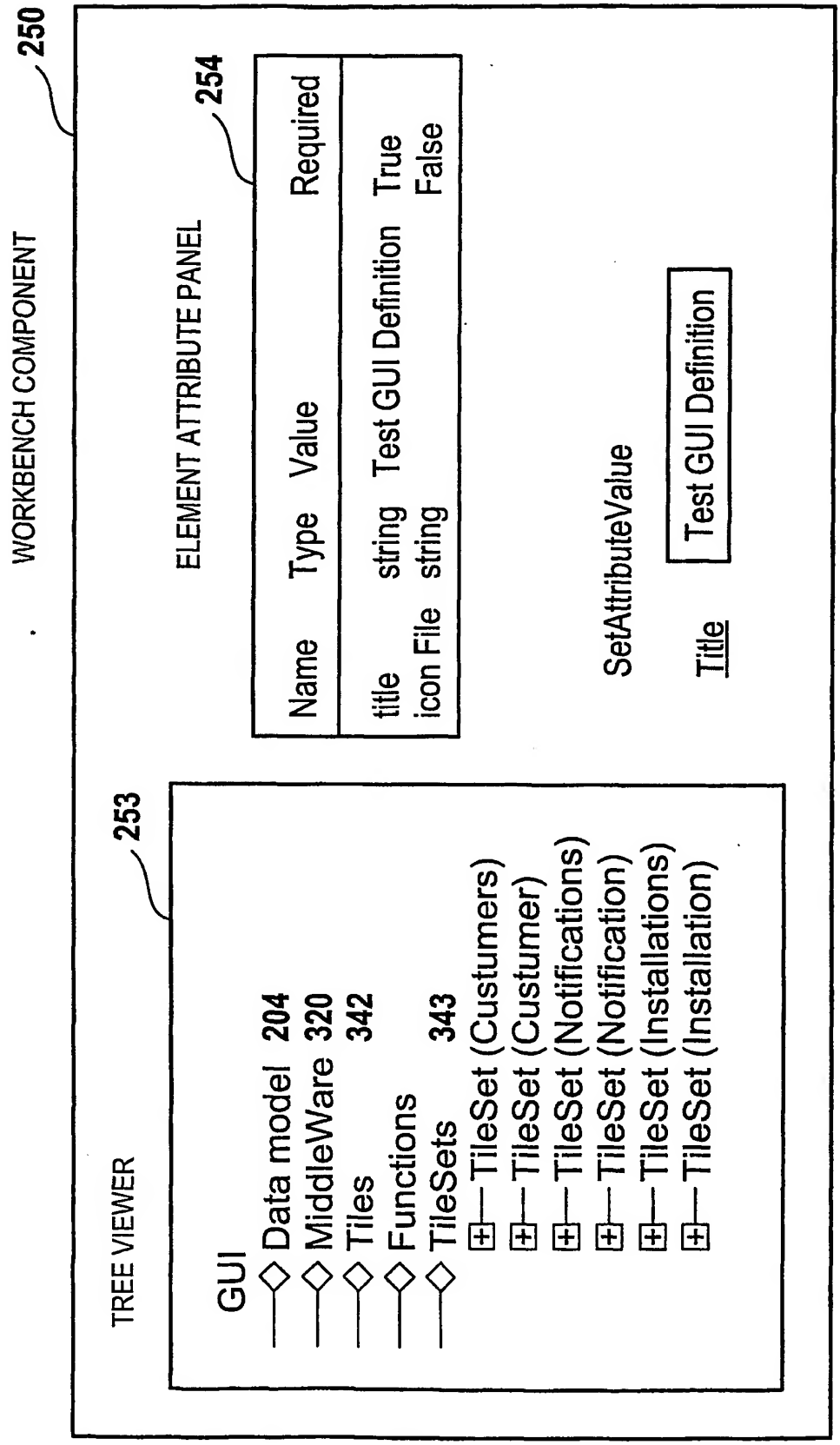
250
WORKBENCH COMPONENT
TREE VIEWER
253
GUI
Data model 204
MiddleWare 320
Tiles 342
Functions
TileSets 343
TileSet (Custumers)
TileSet (Custumer)
TileSet (Notifications)
TileSet (Notification)
TileSet (Installations)
TileSet (Installation)
ELEMENT ATTRIBUTE PANEL
254
Name
Type
Value
Required
title
string
Test GUI Definition
True
icon File
string
False
SetAttributeValue
Title
Test GUI Definition

FIG. 7

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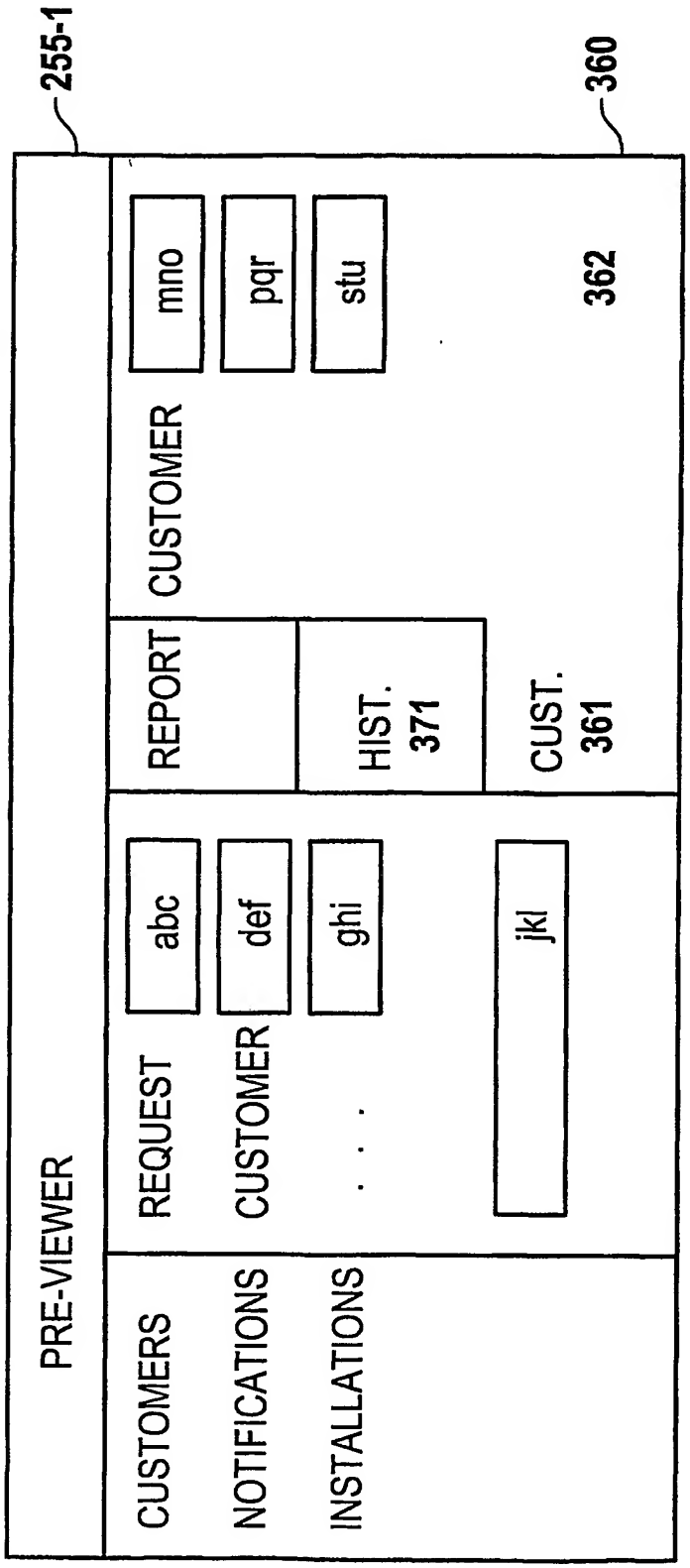
255-1
360
PRE-VIEWER
CUSTOMERS
NOTIFICATIONS
INSTALLATIONS
REQUEST
CUSTOMER
. . .
abc
def
ghi
jkl
REPORT
HIST. 371
CUST. 361
CUSTOMER
mno
pqr
stu
362

FIG. 8

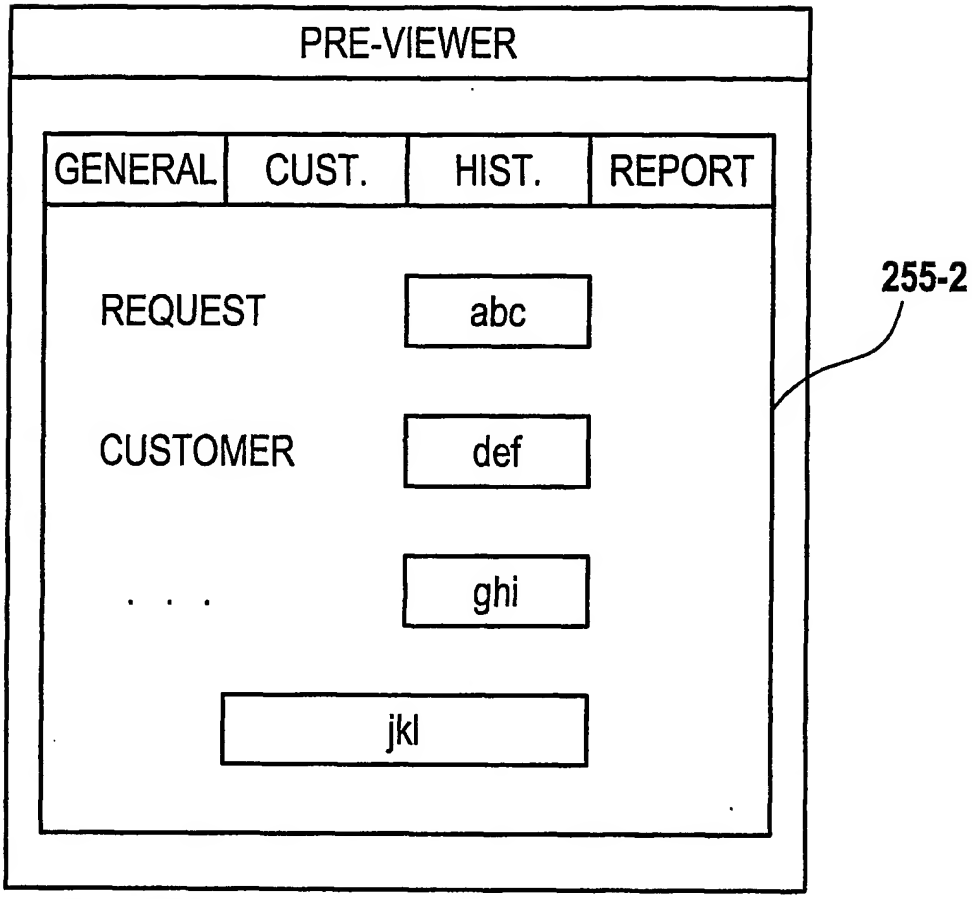
PRE-VIEWER
GENERAL
CUST.
HIST.
REPORT
REQUEST
abc
CUSTOMER
def
. . .
ghi
jkl
255-2

FIG. 9

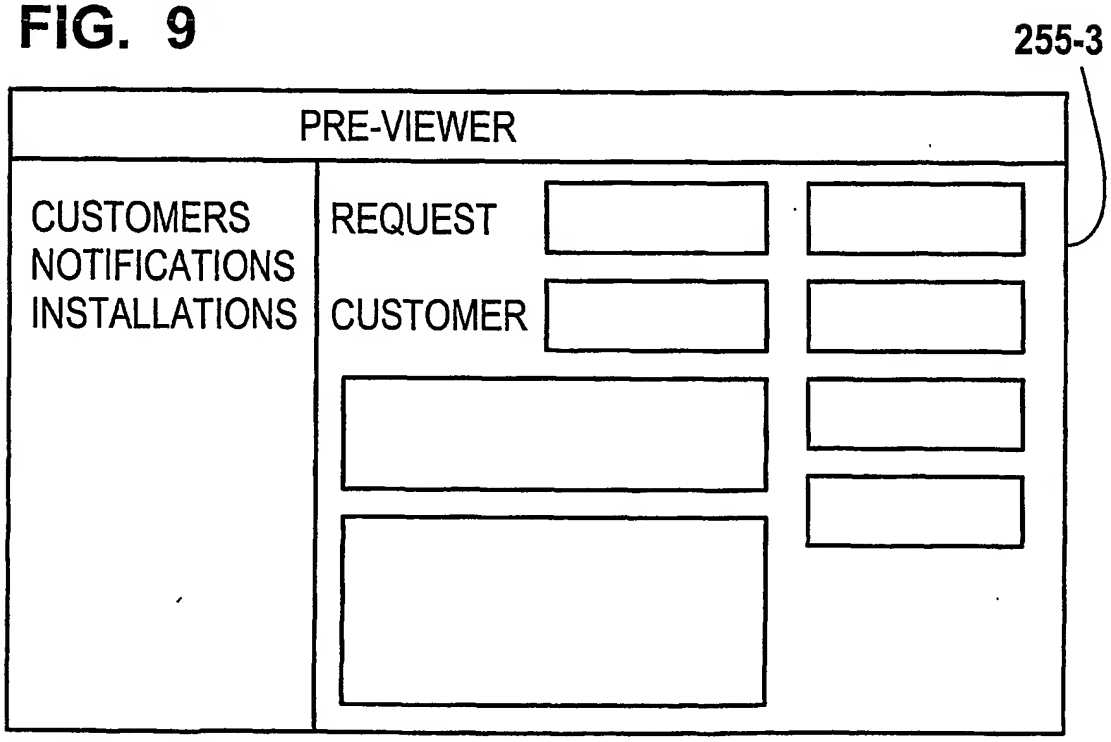
PRE-VIEWER
CUSTOMERS
NOTIFICATIONS
INSTALLATIONS
REQUEST
CUSTOMER
255-3

FIG. 10

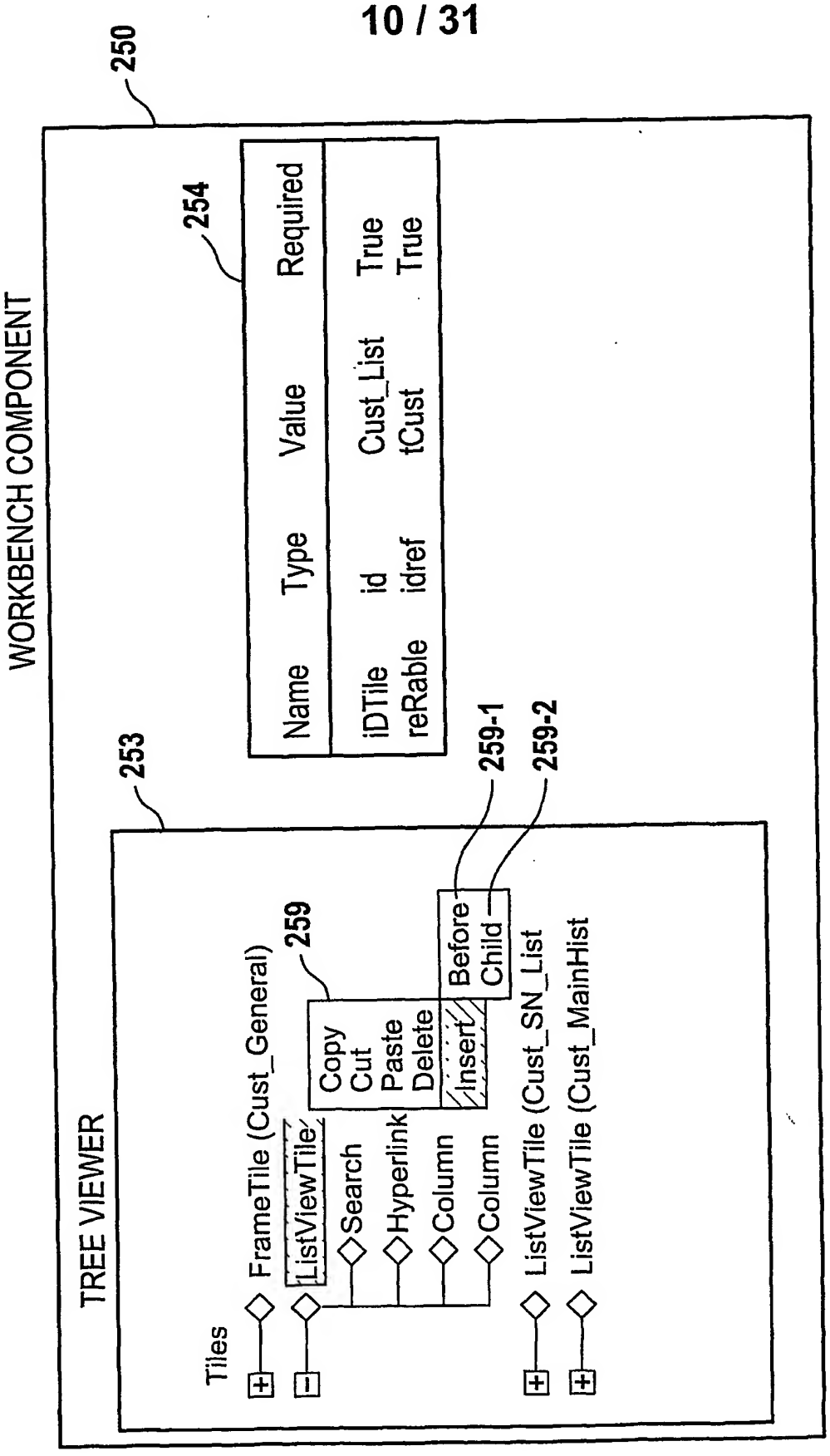
250
WORKBENCH COMPONENT
254
Name
Type
Value
Required
iDTile
id
Cust_List
True
reRable
idref
tCust
True
253
TREE VIEWER
259-1
259-2
259
Tiles
FrameTile (Cust_General)
ListViewTile
Search
Hyperlink
Column
Column
ListViewTile (Cust_SN_List
ListViewTile (Cust_MainHist
Copy
Cut
Paste
Delete
Insert
Before
Child

FIG. 11

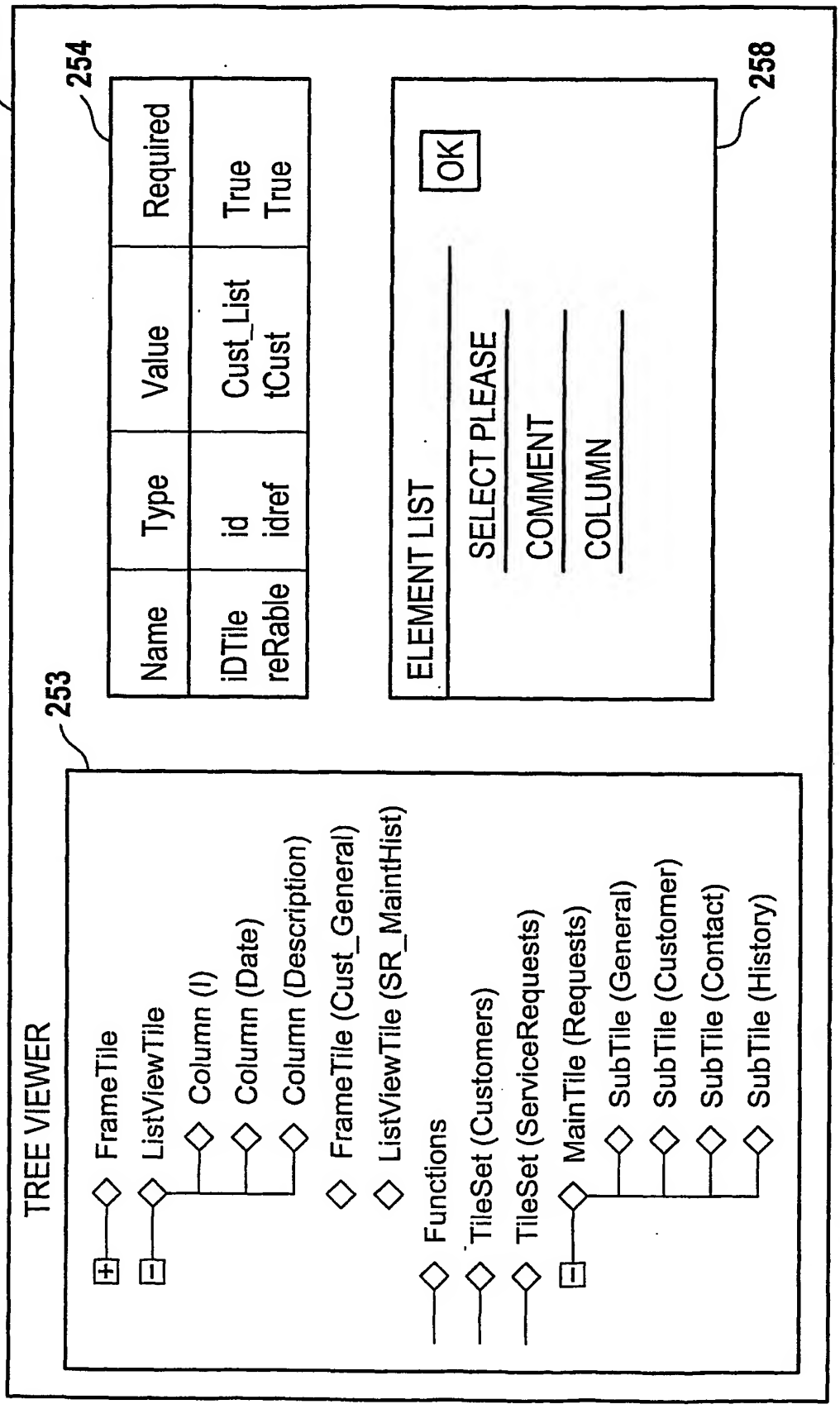
WORKBENCH COMPONENT
250
TREE VIEWER
253
FrameTile
ListViewTile
Column (I)
Column (Date)
Column (Description)
FrameTile (Cust_General)
ListViewTile (SR_MaintHist)
Functions
TileSet (Customers)
TileSet (ServiceRequests)
MainTile (Requests)
SubTile (General)
SubTile (Customer)
SubTile (Contact)
SubTile (History)
254
Name
Type
Value
Required
iDTile
reRable
id
idref
Cust_List
tCust
True
True
ELEMENT LIST
OK
SELECT PLEASE
COMMENT
COLUMN
258

FIG. 12

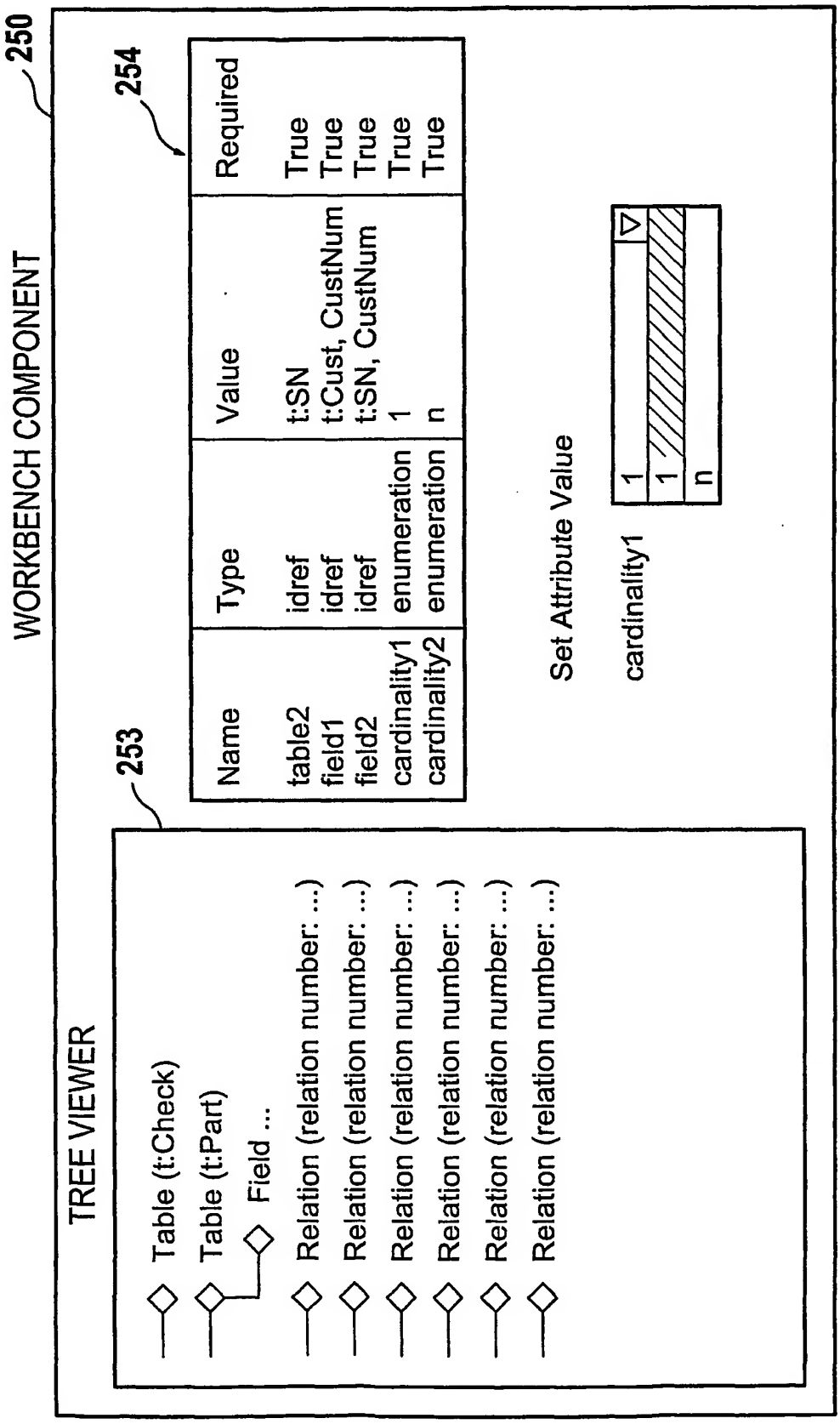
250
WORKBENCH COMPONENT
253
TREE VIEWER
Table (t:Check)
Table (t:Part)
Field ...
Relation (relation number: ...)
Relation (relation number: ...)
Relation (relation number: ...)
Relation (relation number: ...)
Relation (relation number: ...)
Relation (relation number: ...)
254
Name
Type
Value
Required
table2 idref t:SN True
field1 idref t:Cust, CustNum True
field2 idref t:SN, CustNum True
cardinality1 enumeration 1 True
cardinality2 enumeration n True
Set Attribute Value
cardinality1
1
1
n

FIG. 13

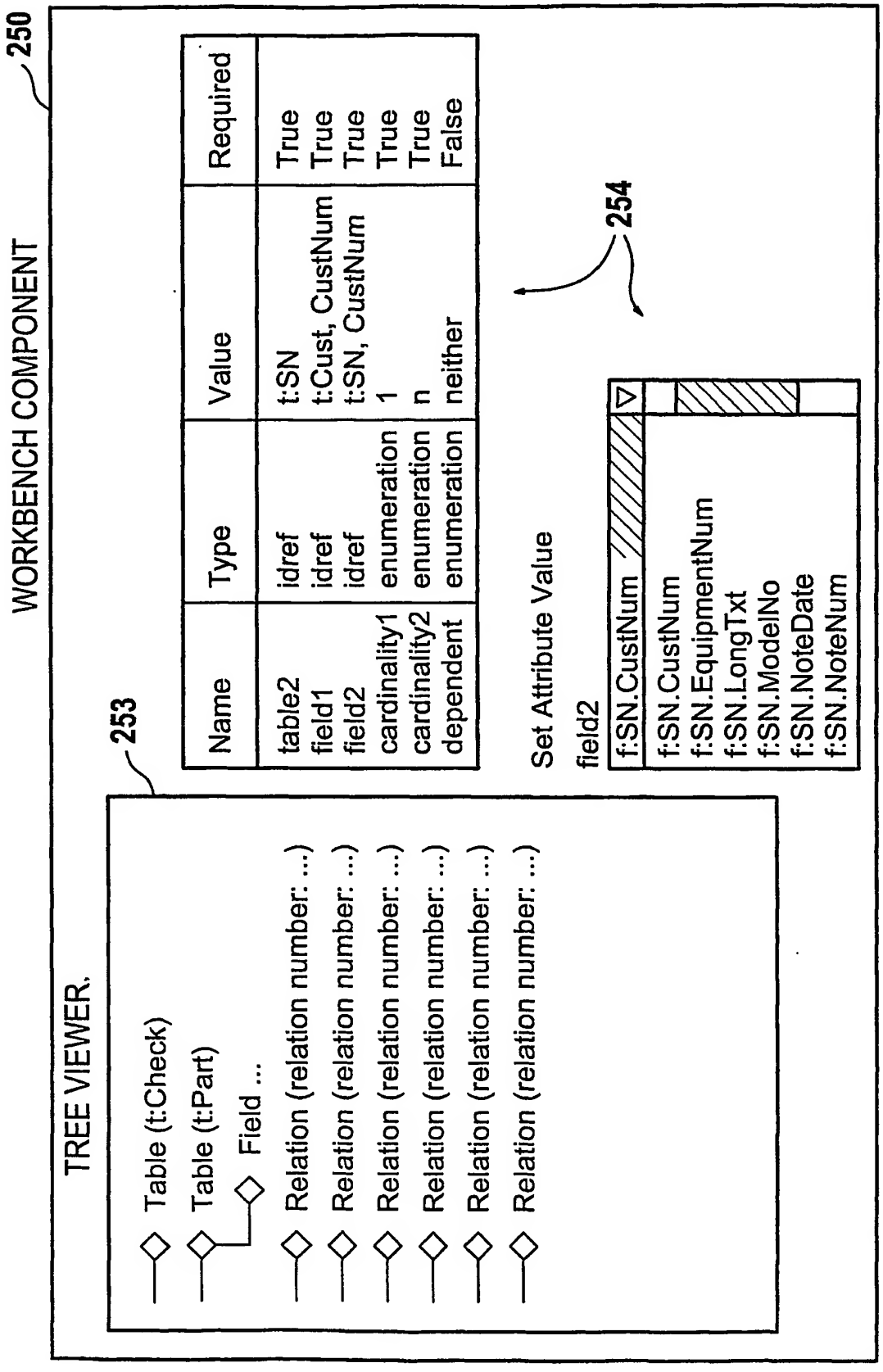
250
WORKBENCH COMPONENT
253
TREE VIEWER
Table (t:Check)
Table (t:Part)
Field ...
Relation (relation number: ...)
Relation (relation number: ...)
Relation (relation number: ...)
Relation (relation number: ...)
Relation (relation number: ...)
Relation (relation number: ...)
Name
Type
Value
Required
table2
field1
field2
cardinality1
cardinality2
dependent
idref
idref
idref
enumeration
enumeration
enumeration
t:SN
t:Cust, CustNum
t:SN, CustNum
1
n
neither
True
True
True
True
True
False
254
Set Attribute Value
field2
f:SN.CustNum
f:SN.CustNum
f:SN.EquipmentNum
f:SN.LongTxt
f:SN.ModelNo
f:SN.NoteDate
f:SN.NoteNum

FIG. 14

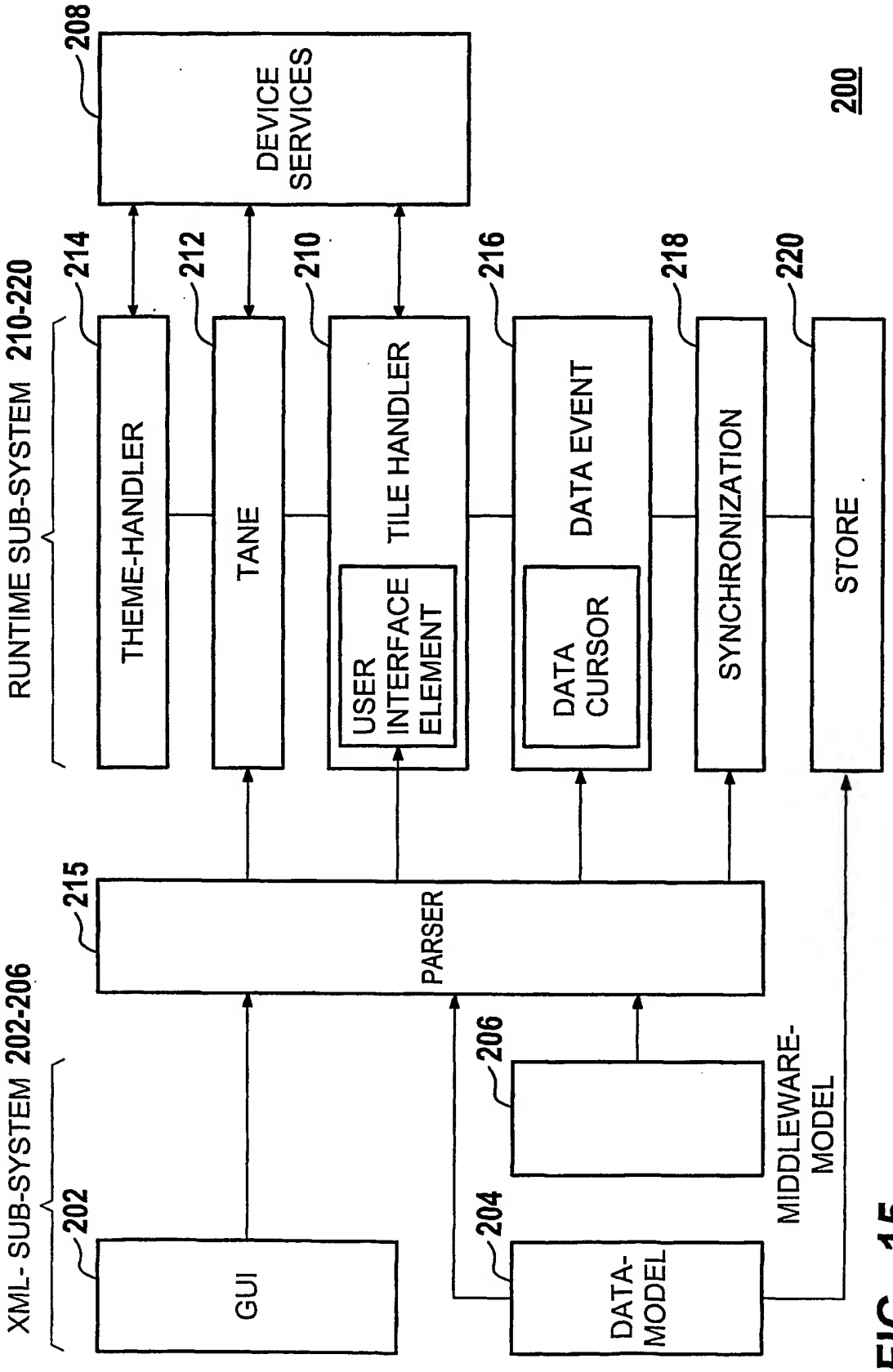
200
208
DEVICE SERVICES
214
212
210
216
218
220
RUNTIME SUB-SYSTEM 210-220
THEME-HANDLER
TANE
TILE HANDLER
USER INTERFACE ELEMENT
DATA EVENT
DATA CURSOR
SYNCHRONIZATION
STORE
215
PARSER
XML- SUB-SYSTEM 202-206
206
MIDDLEWARE-MODEL
202
GUI
204
DATA-MODEL

FIG. 15

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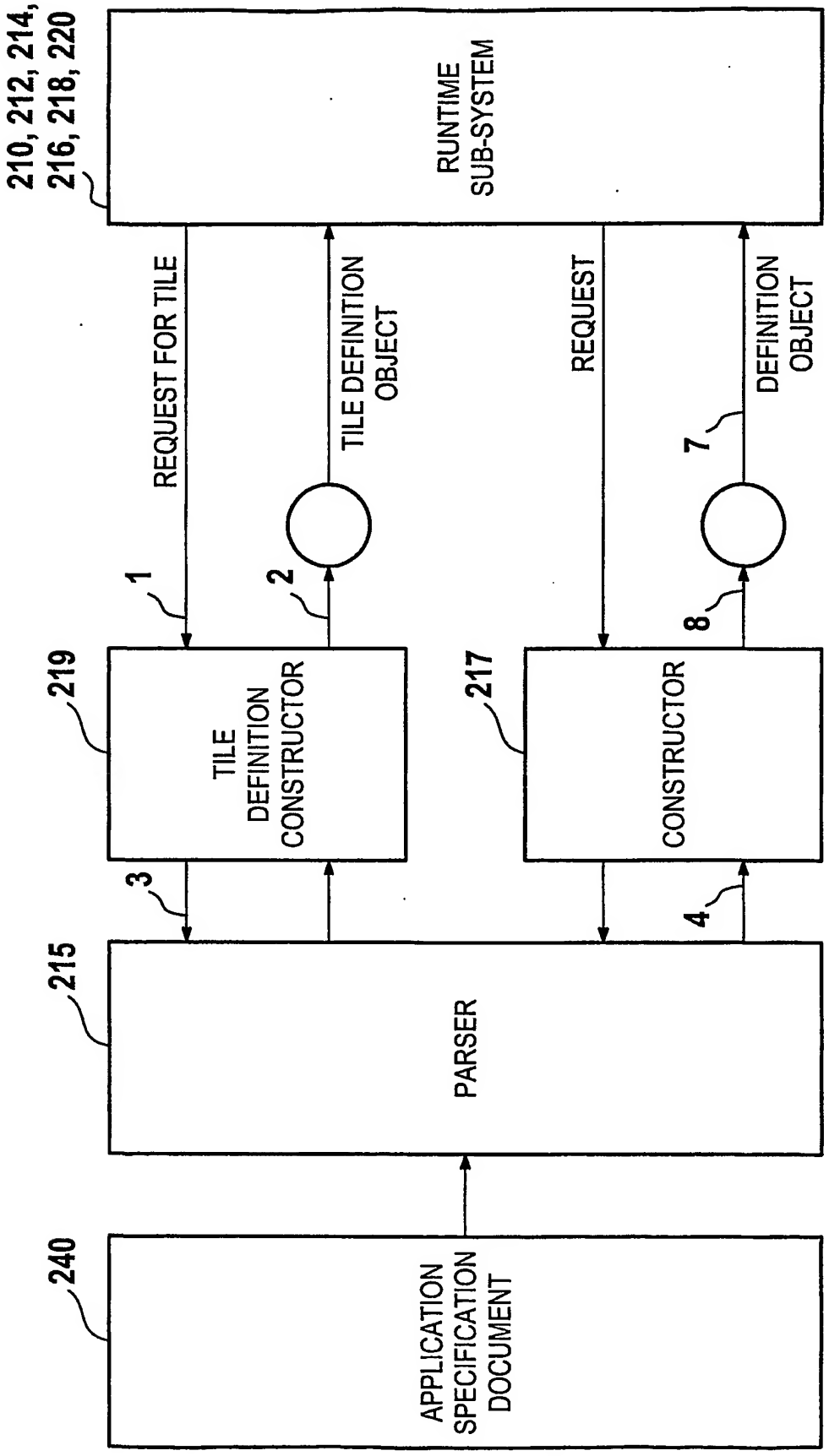
210, 212, 214, 216, 218, 220
RUNTIME SUB-SYSTEM
REQUEST FOR TILE
TILE DEFINITION OBJECT
REQUEST
DEFINITION OBJECT
1
2
7
8
219
TILE DEFINITION CONSTRUCTOR
217
CONSTRUCTOR
3
4
215
PARSER
240
APPLICATION SPECIFICATION DOCUMENT

FIG. 16

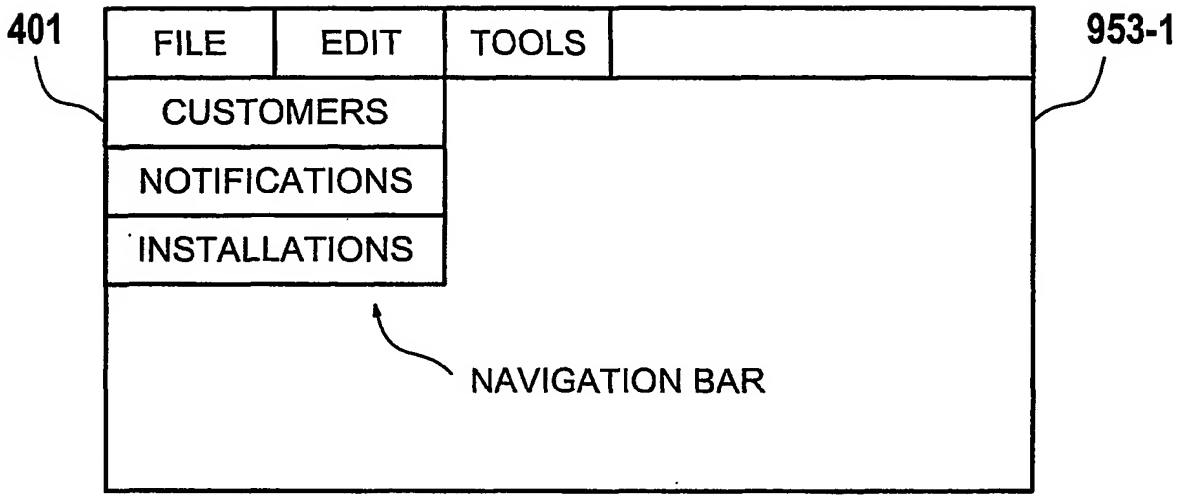

FIG. 17A

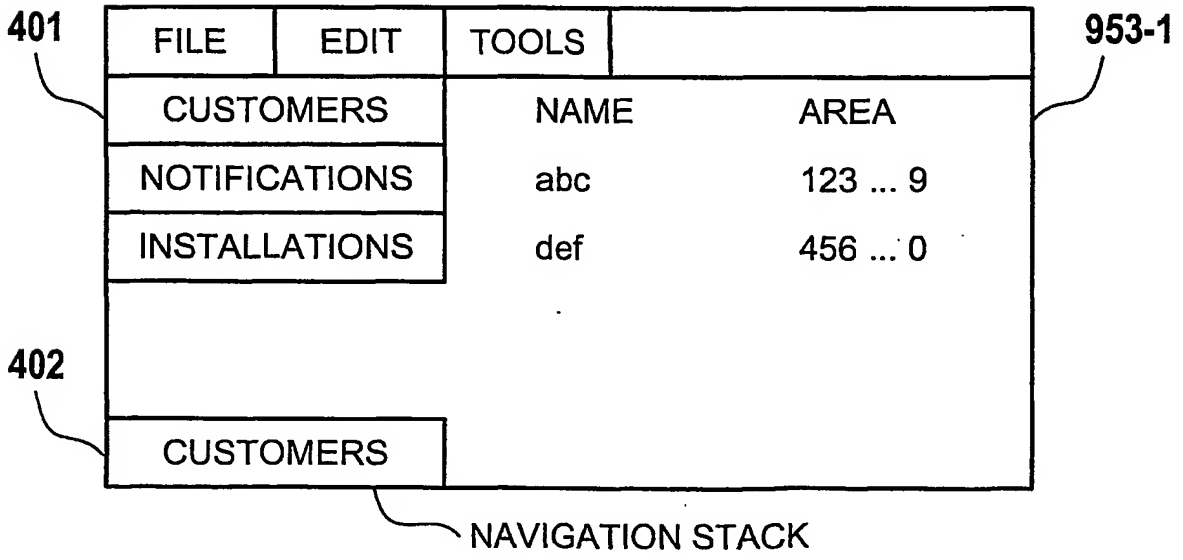

FIG. 17B

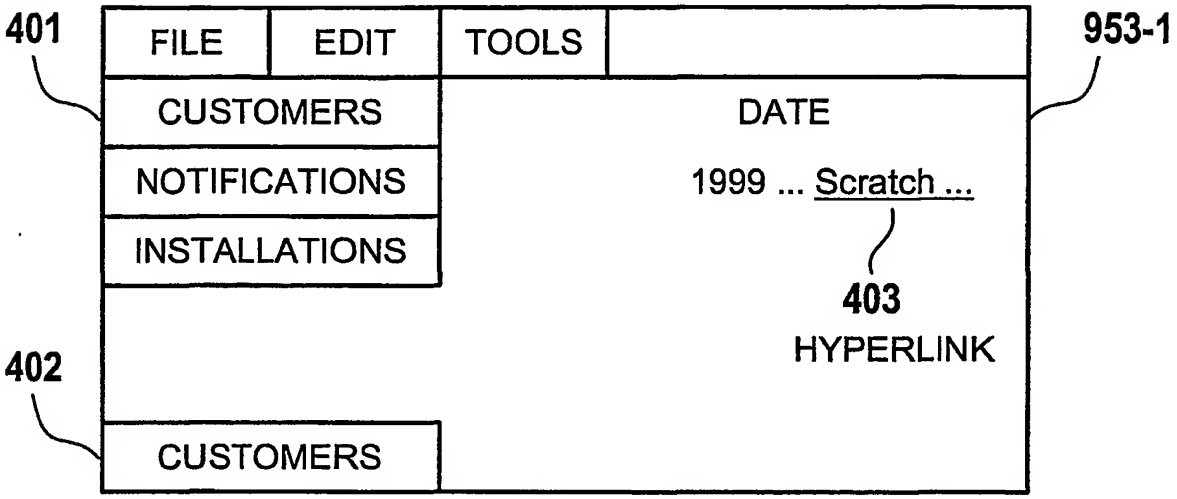

FIG. 17C

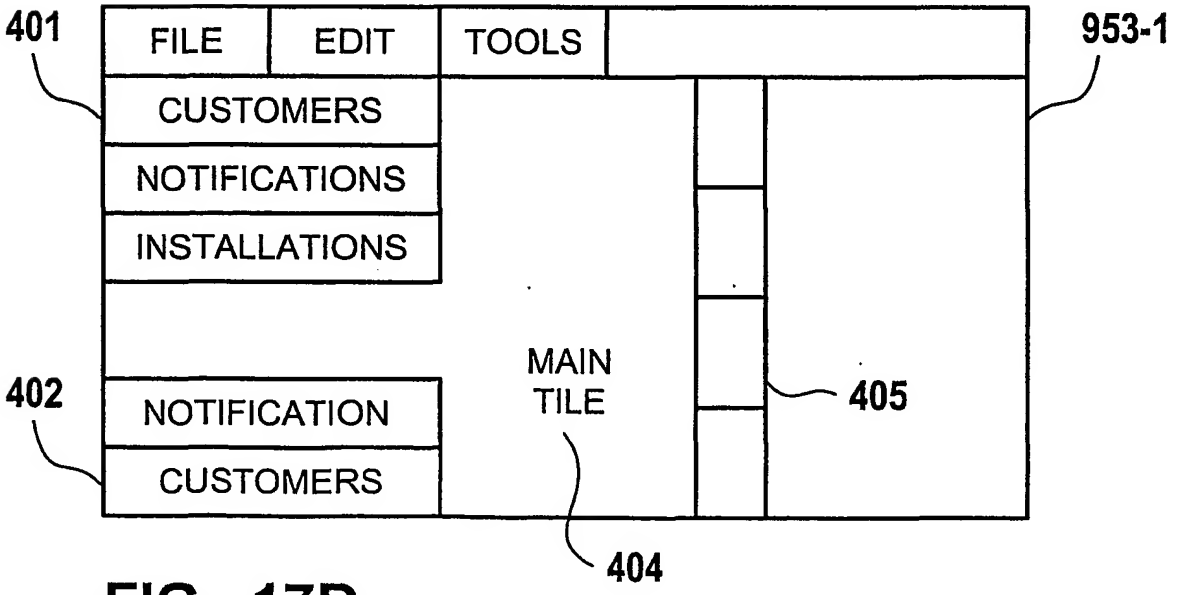

FIG. 17D

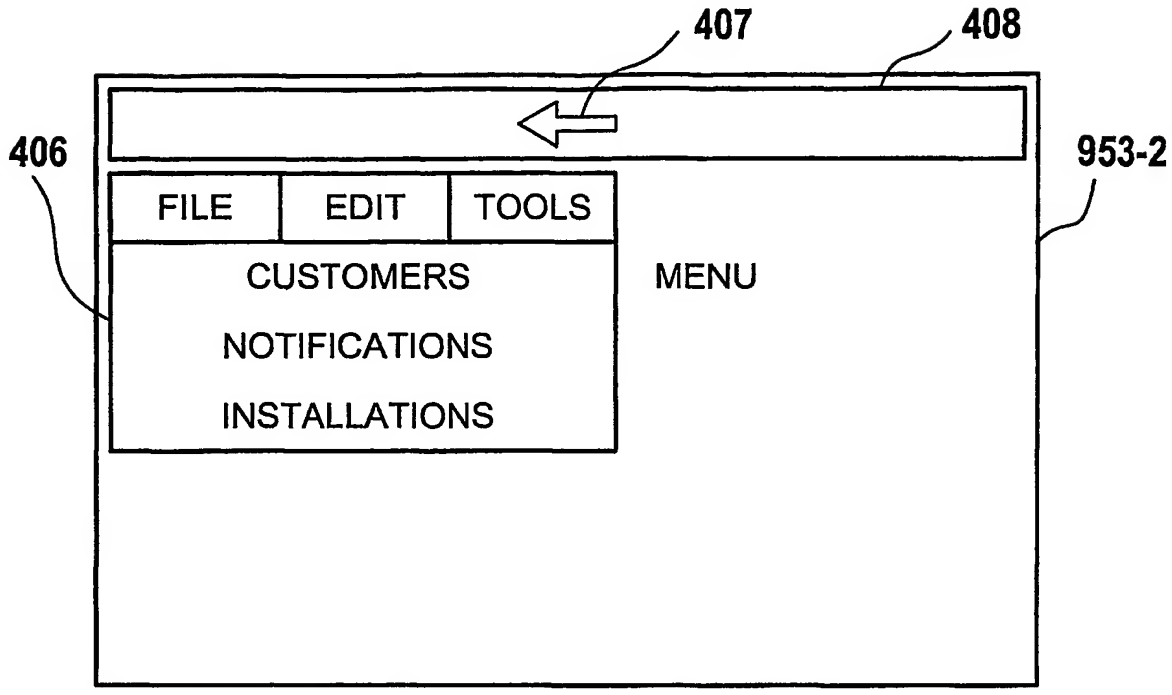

FIG. 18A

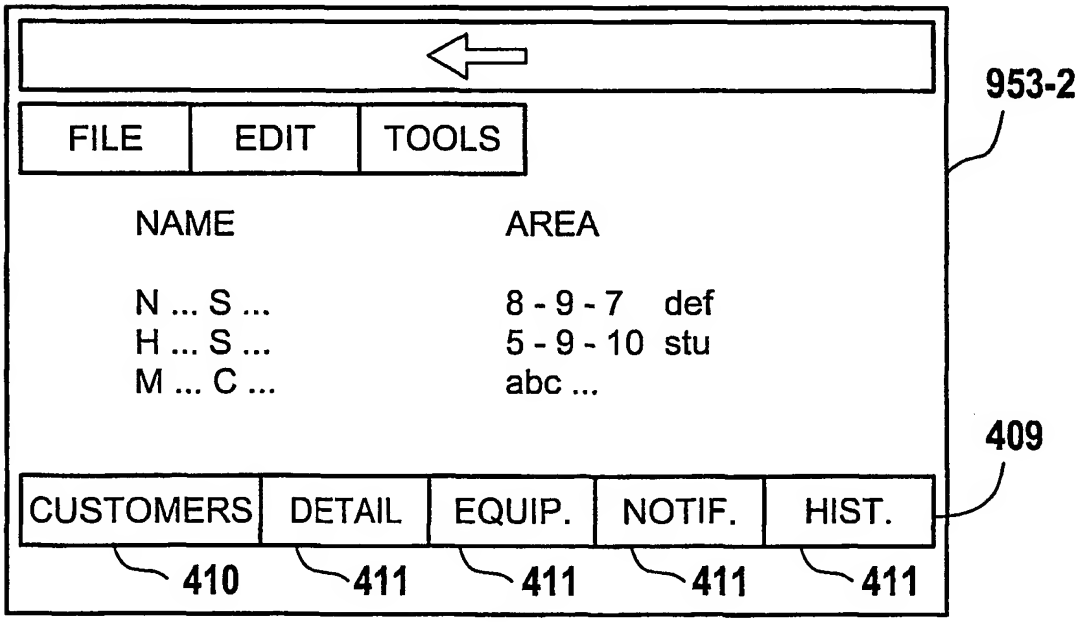

FIG. 18B

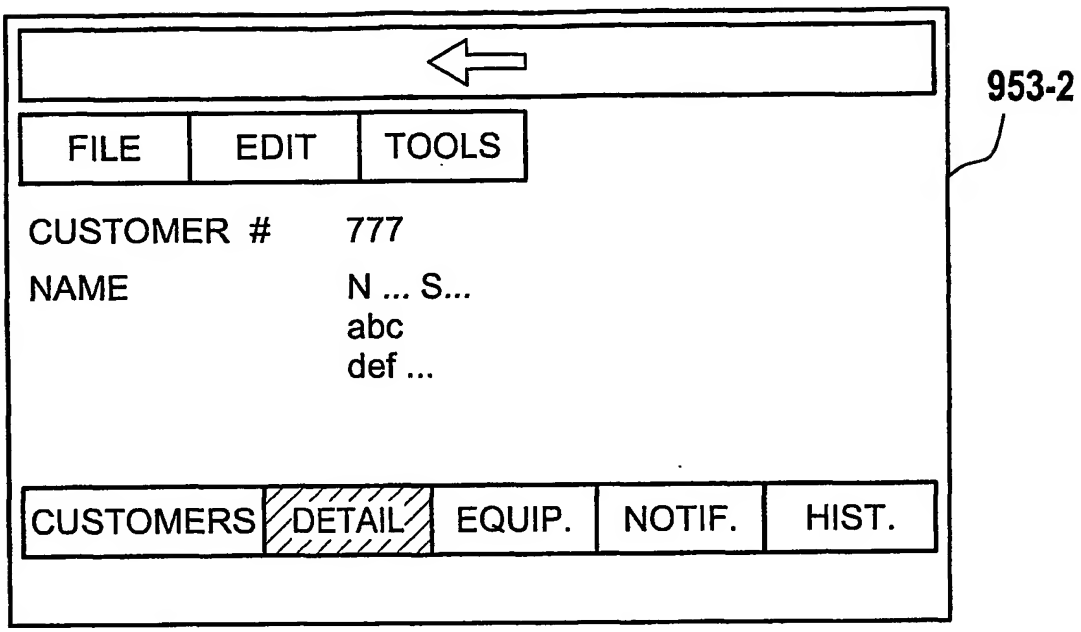

FIG. 18C

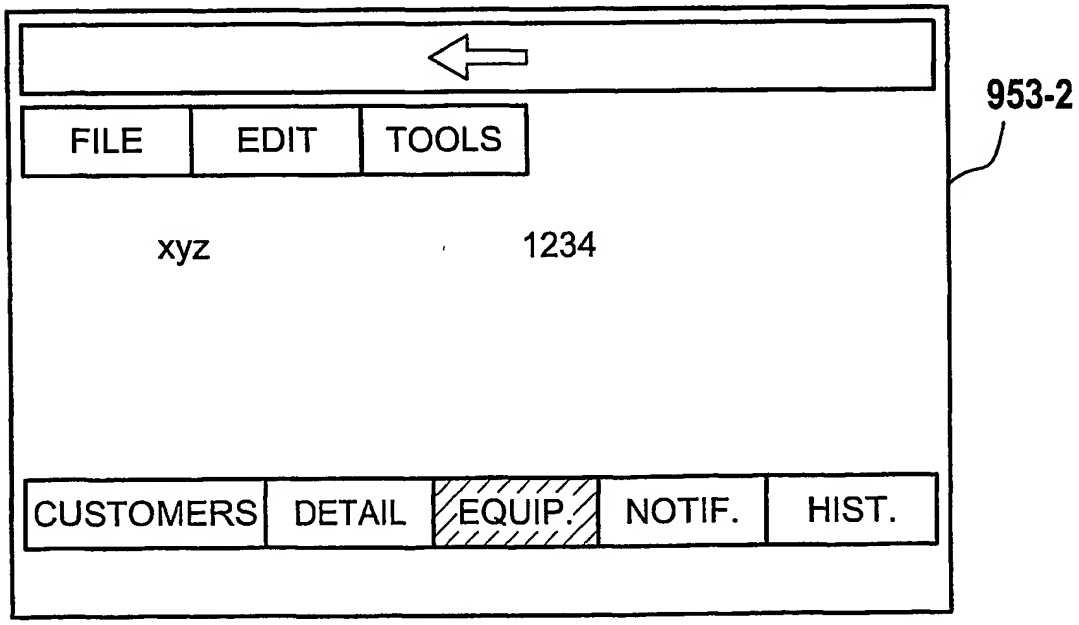

FIG. 18D

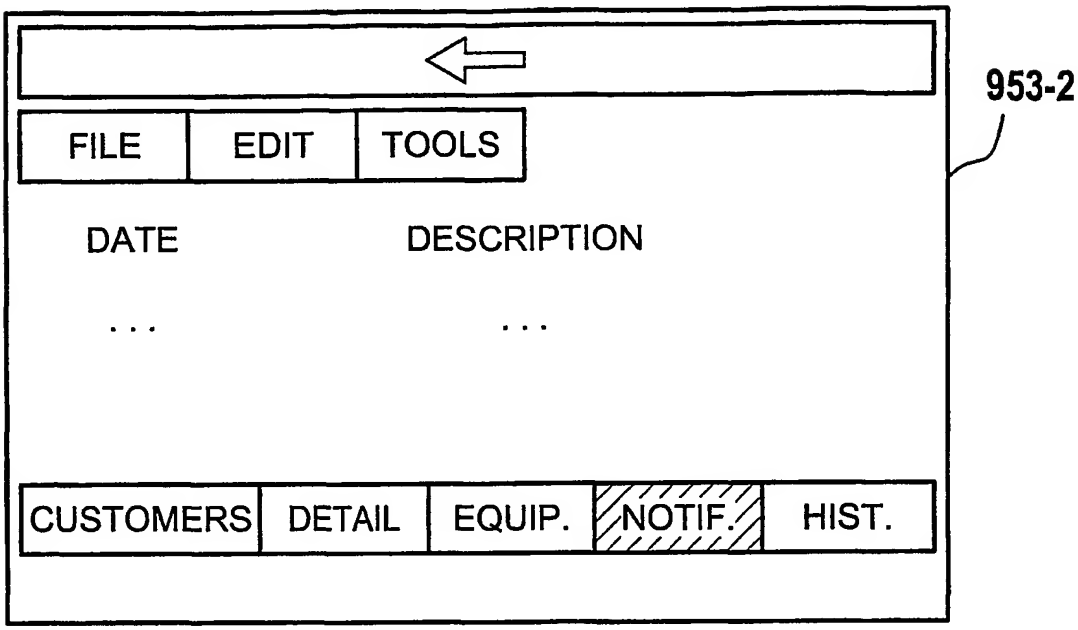

FIG. 18E

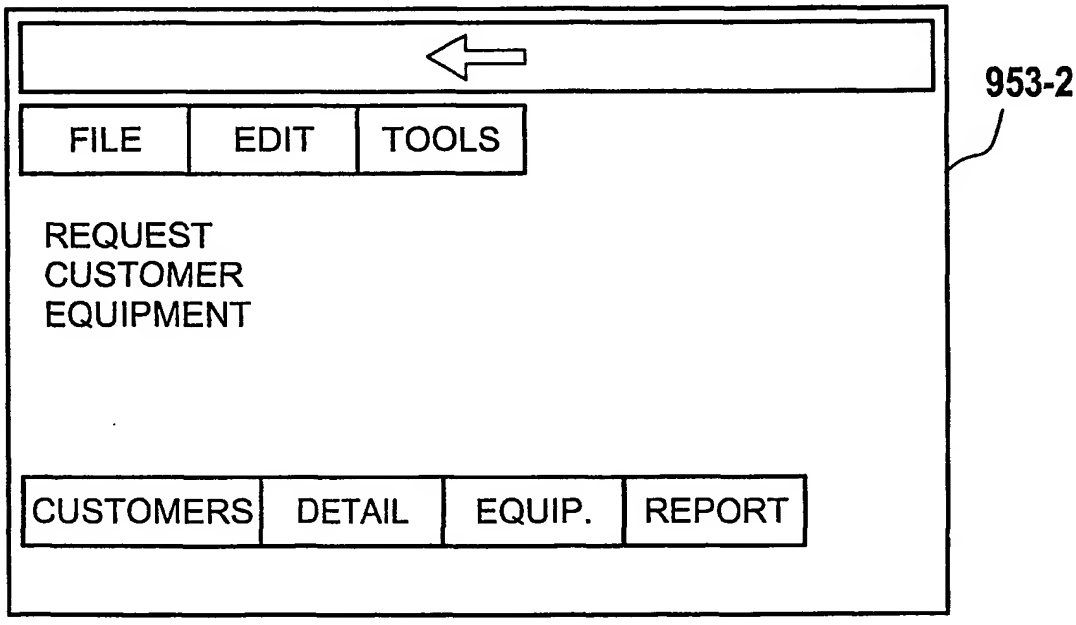

FIG. 18F

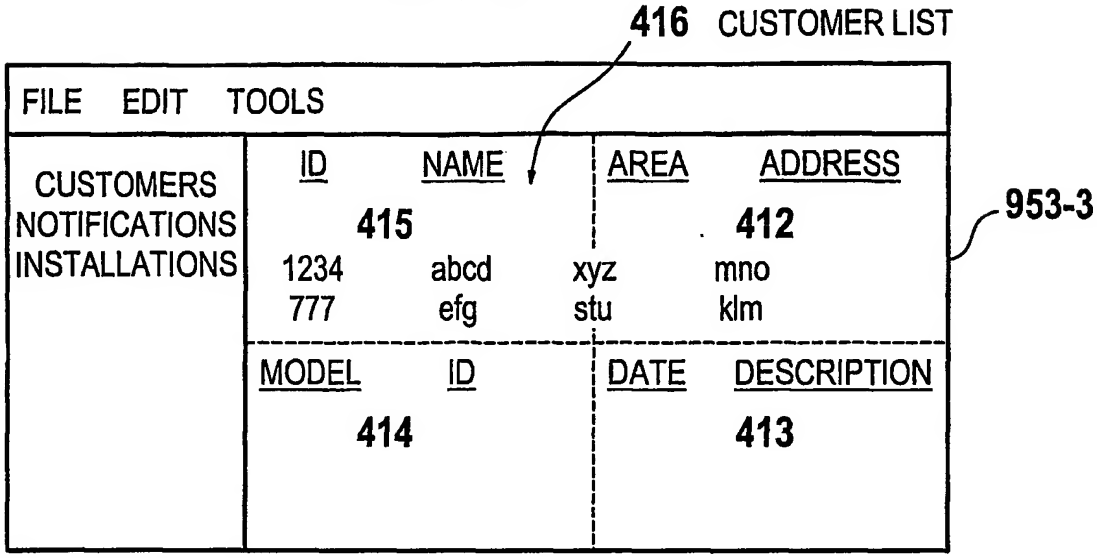

FIG. 19A

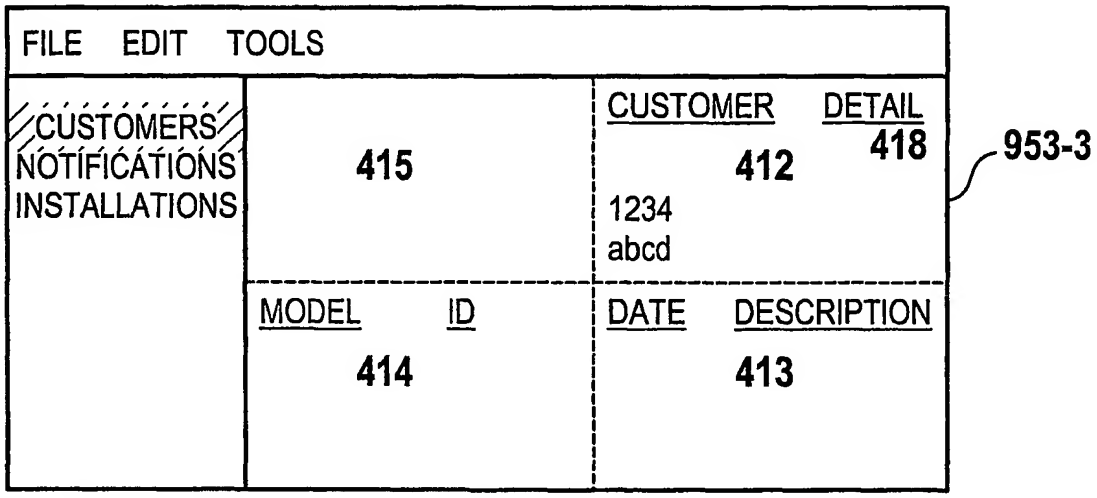

FIG. 19B

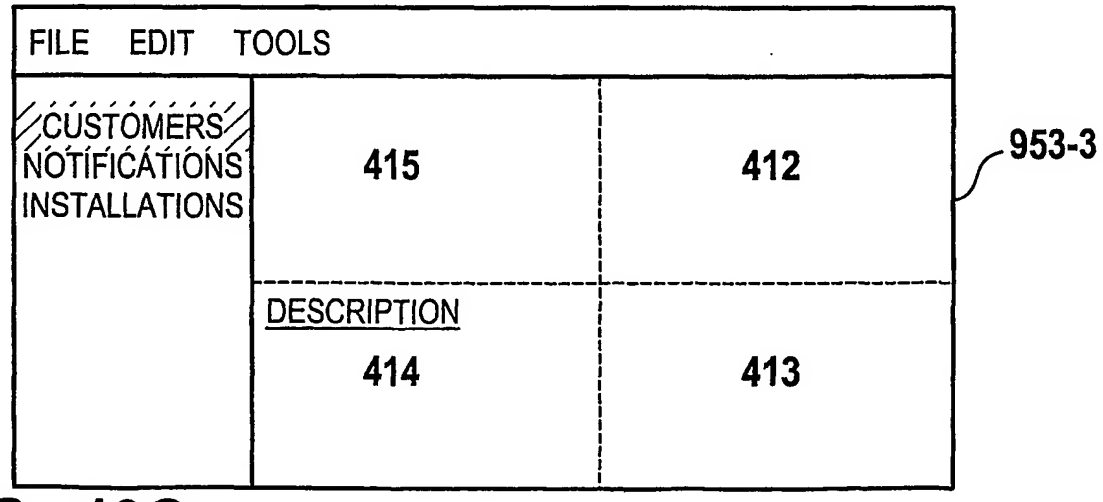

FIG. 19C

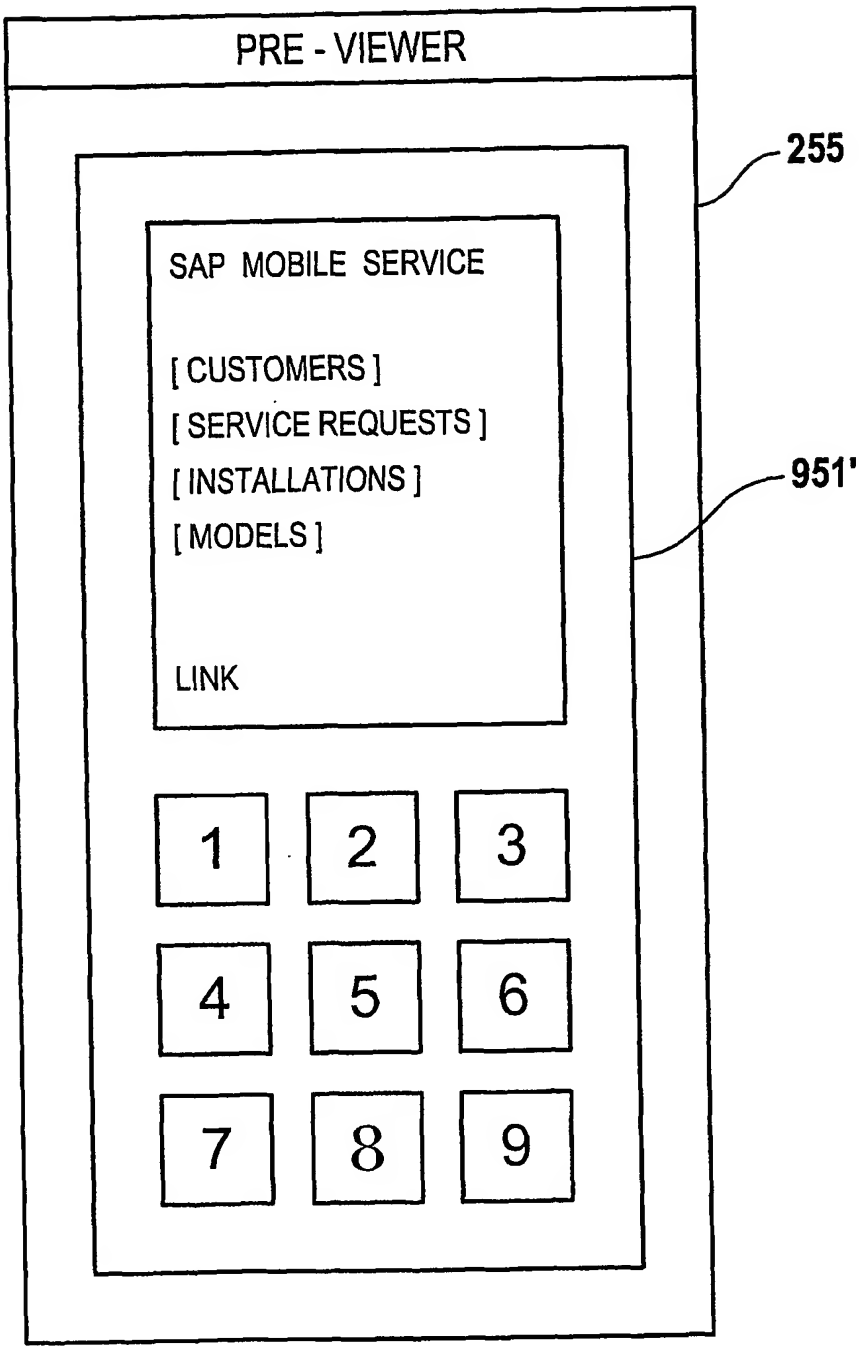
PRE - VIEWER
255
SAP MOBILE SERVICE
[CUSTOMERS]
[SERVICE REQUESTS]
[INSTALLATIONS]
[MODELS]
951'
LINK
1
2
3
4
5
6
7
8
9

FIG. 20A

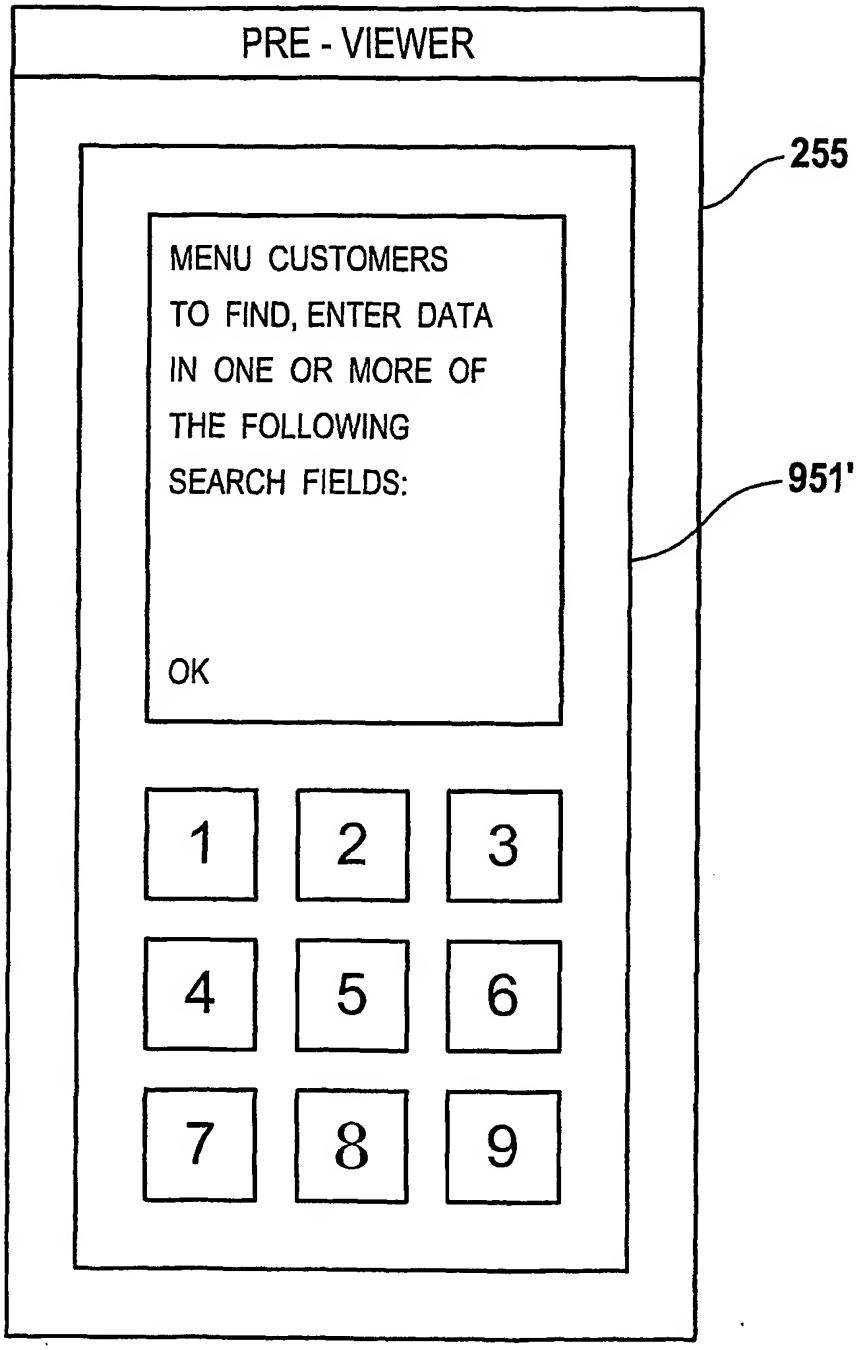
PRE - VIEWER
255
MENU CUSTOMERS
TO FIND, ENTER DATA
IN ONE OR MORE OF
THE FOLLOWING
SEARCH FIELDS:
951'
OK
1
2
3
4
5
6
7
8
9

FIG. 20B

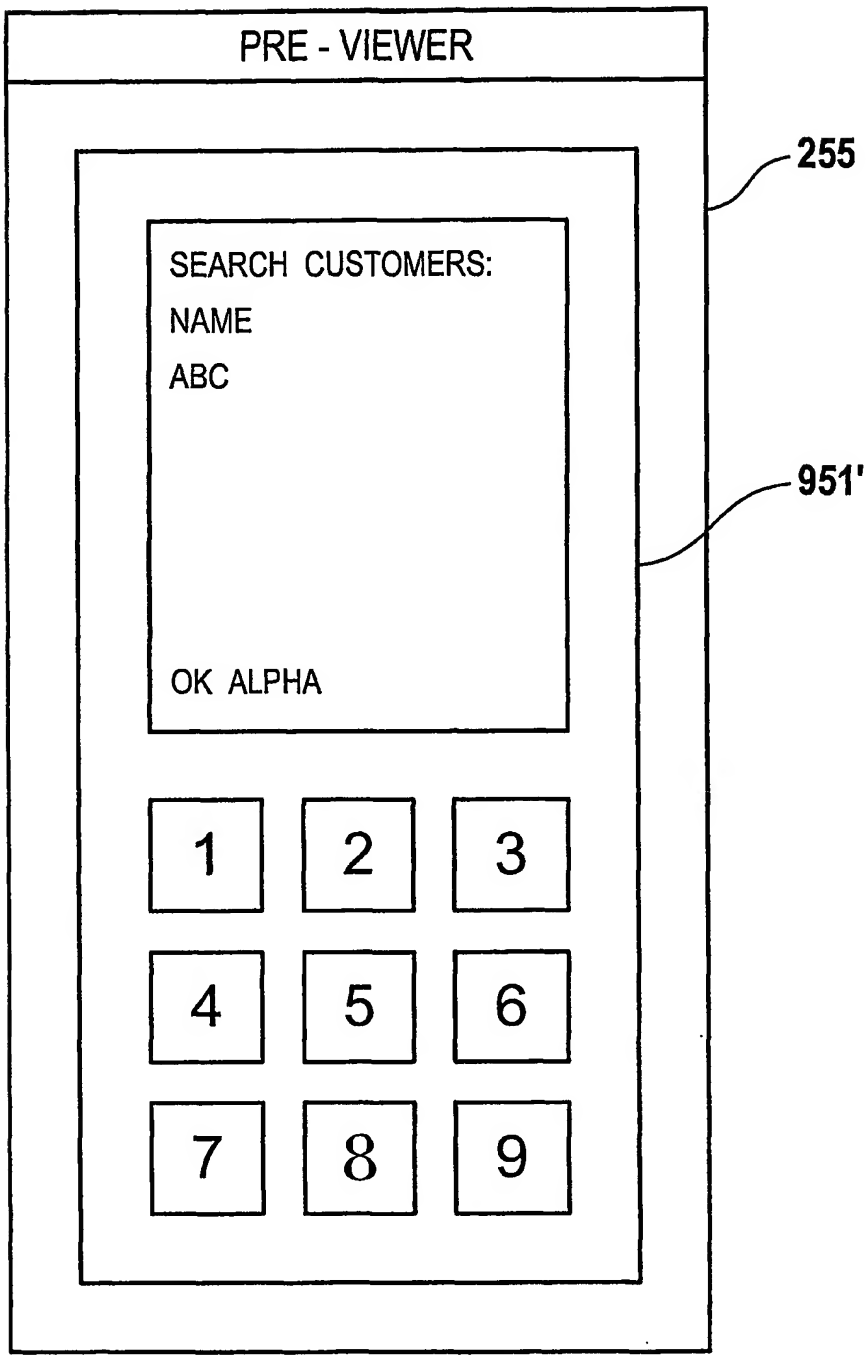
PRE - VIEWER
255
SEARCH CUSTOMERS:
NAME
ABC
951'
OK ALPHA
1
2
3
4
5
6
7
8
9

FIG. 20C

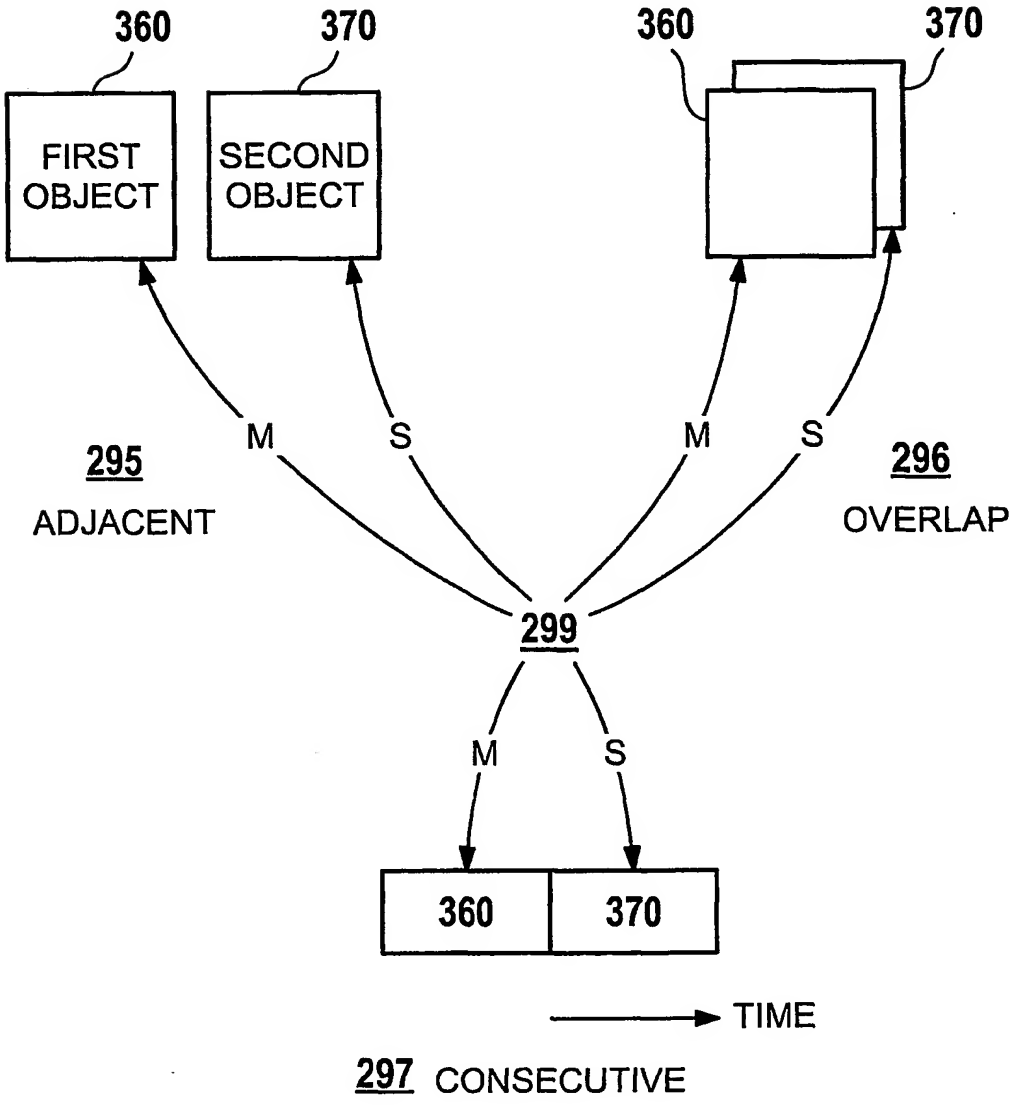
360
370
360
370
FIRST OBJECT
SECOND OBJECT
M
S
M
S
295
ADJACENT
296
OVERLAP
299
M
S
360
370
TIME
297 CONSECUTIVE

FIG. 21

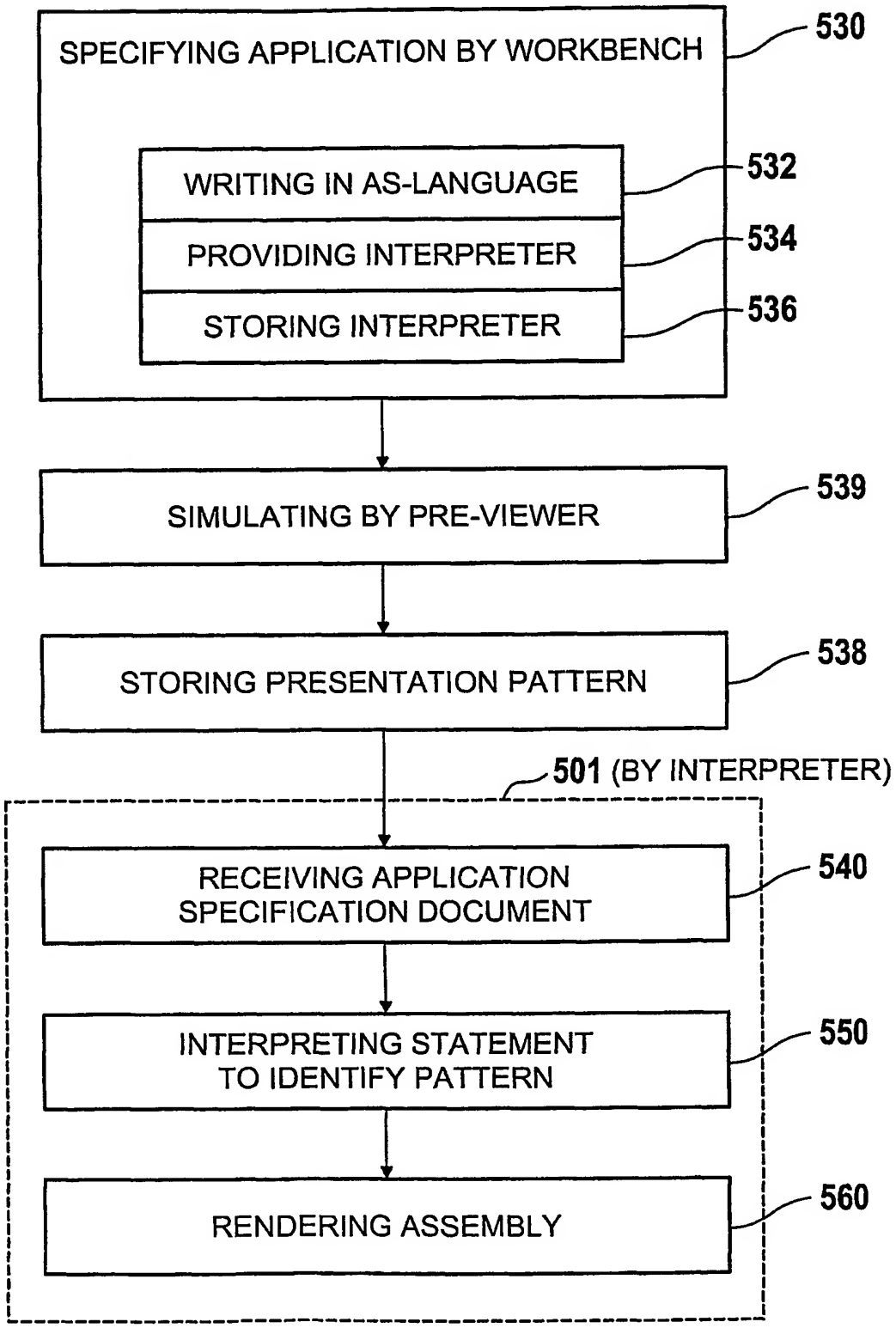
SPECIFYING APPLICATION BY WORKBENCH
530
WRITING IN AS-LANGUAGE
532
PROVIDING INTERPRETER
534
STORING INTERPRETER
536
SIMULATING BY PRE-VIEWER
539
STORING PRESENTATION PATTERN
538
501 (BY INTERPRETER)
RECEIVING APPLICATION SPECIFICATION DOCUMENT
540
INTERPRETING STATEMENT TO IDENTIFY PATTERN
550
RENDERING ASSEMBLY
560
500

FIG. 22

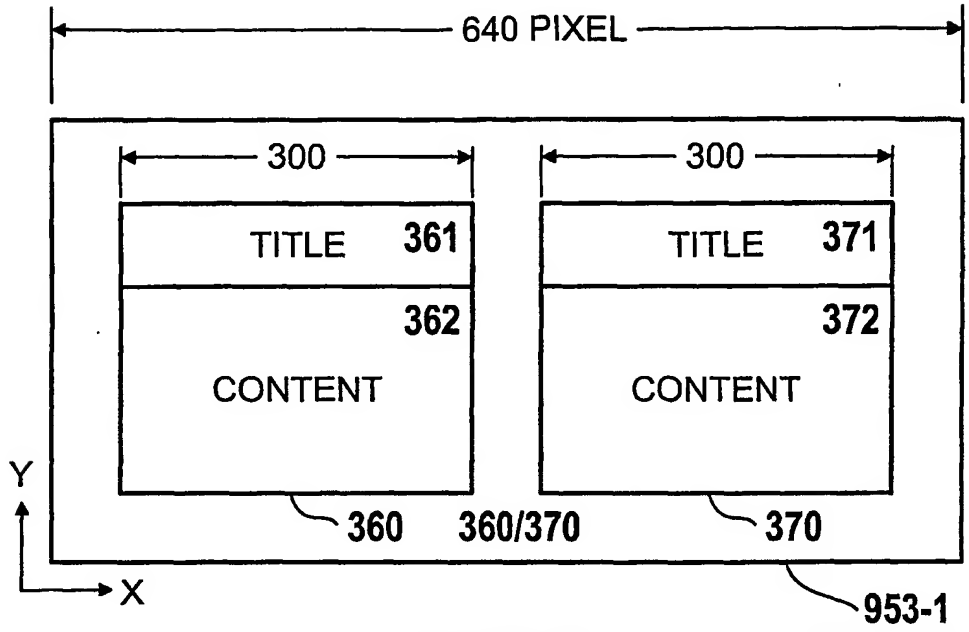

FIG. 23

ADJACENT SCREEN

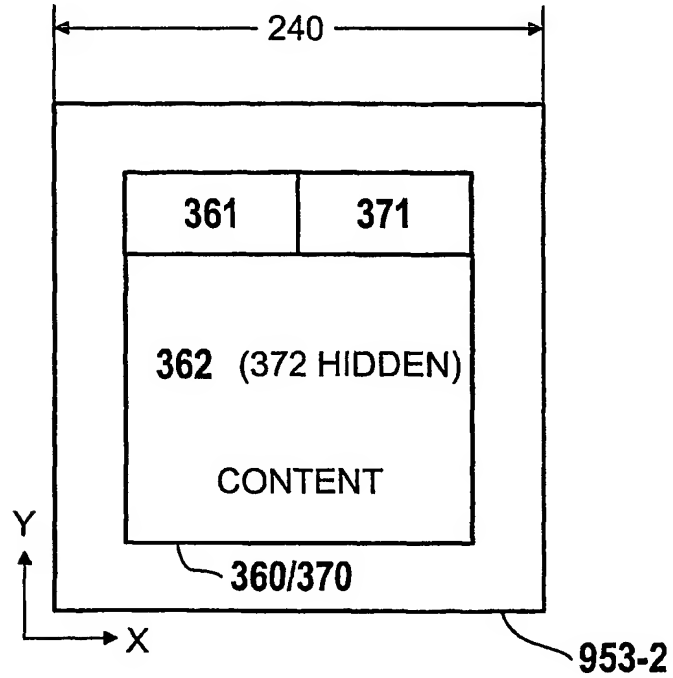

FIG. 24

OVERLAP SCREEN

(1) Welcome to the telephony sales force automation system. Please select an item from the main menu. They are customers, contacts and activities.

(2) Contacts

(3) The selected item is contacts.

(4) Search item with F

(5) There is one item. Item 1 ... of ... . The overview of the selected contact is as follows: The contact name is F... . The email address is F... @ ... .com. What would you like to do now? You can obtain information about the contact history for this contact. You can also obtain more information about this contact. Alternatively, you can go back to the main menu, or ask for repeating what you just heard.

(6) Check the contact detail.

FIG. 25

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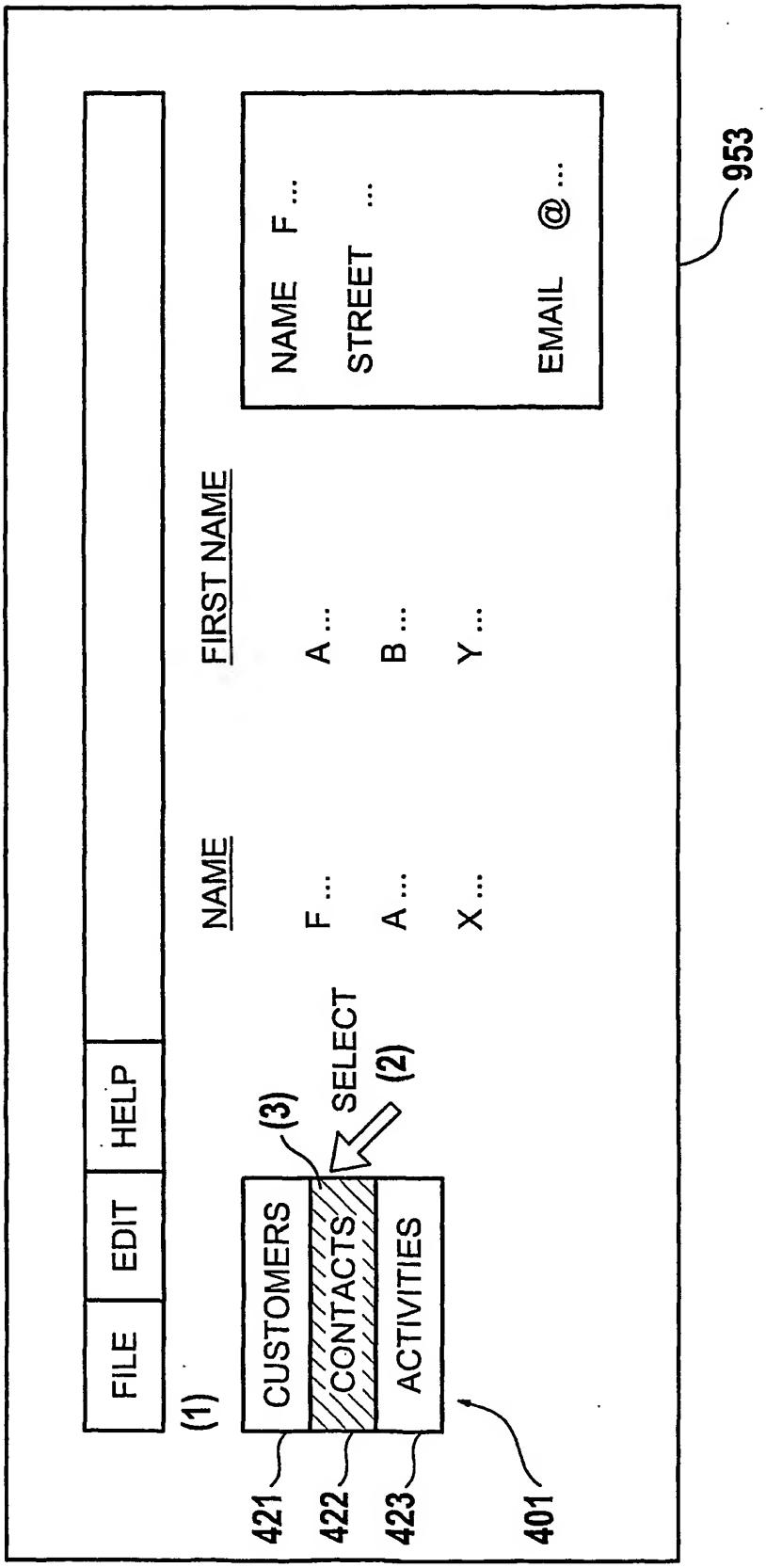
FILE
EDIT
HELP
(1)
CUSTOMERS
CONTACTS
ACTIVITIES
(3)
SELECT
(2)
NAME
FIRST NAME
F ...
A ...
A ...
B ...
X ...
Y ...
NAME F ...
STREET ...
EMAIL @ ...
953
421
422
423
401

FIG. 26

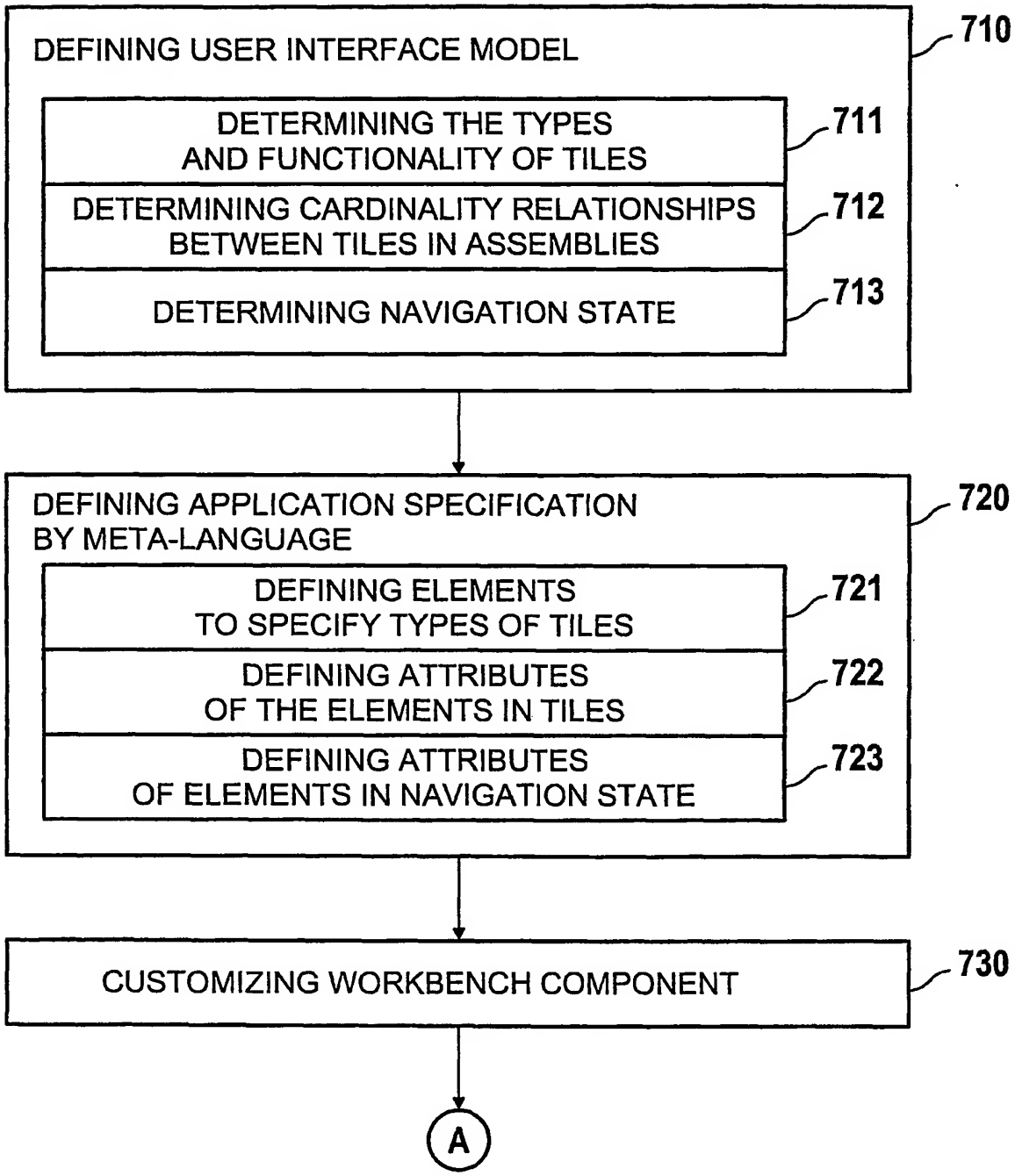
DEFINING USER INTERFACE MODEL
710
DETERMINING THE TYPES AND FUNCTIONALITY OF TILES
711
DETERMINING CARDINALITY RELATIONSHIPS BETWEEN TILES IN ASSEMBLIES
712
DETERMINING NAVIGATION STATE
713
DEFINING APPLICATION SPECIFICATION BY META-LANGUAGE
720
DEFINING ELEMENTS TO SPECIFY TYPES OF TILES
721
DEFINING ATTRIBUTES OF THE ELEMENTS IN TILES
722
DEFINING ATTRIBUTES OF ELEMENTS IN NAVIGATION STATE
723
CUSTOMIZING WORKBENCH COMPONENT
730
A

FIG. 27

700

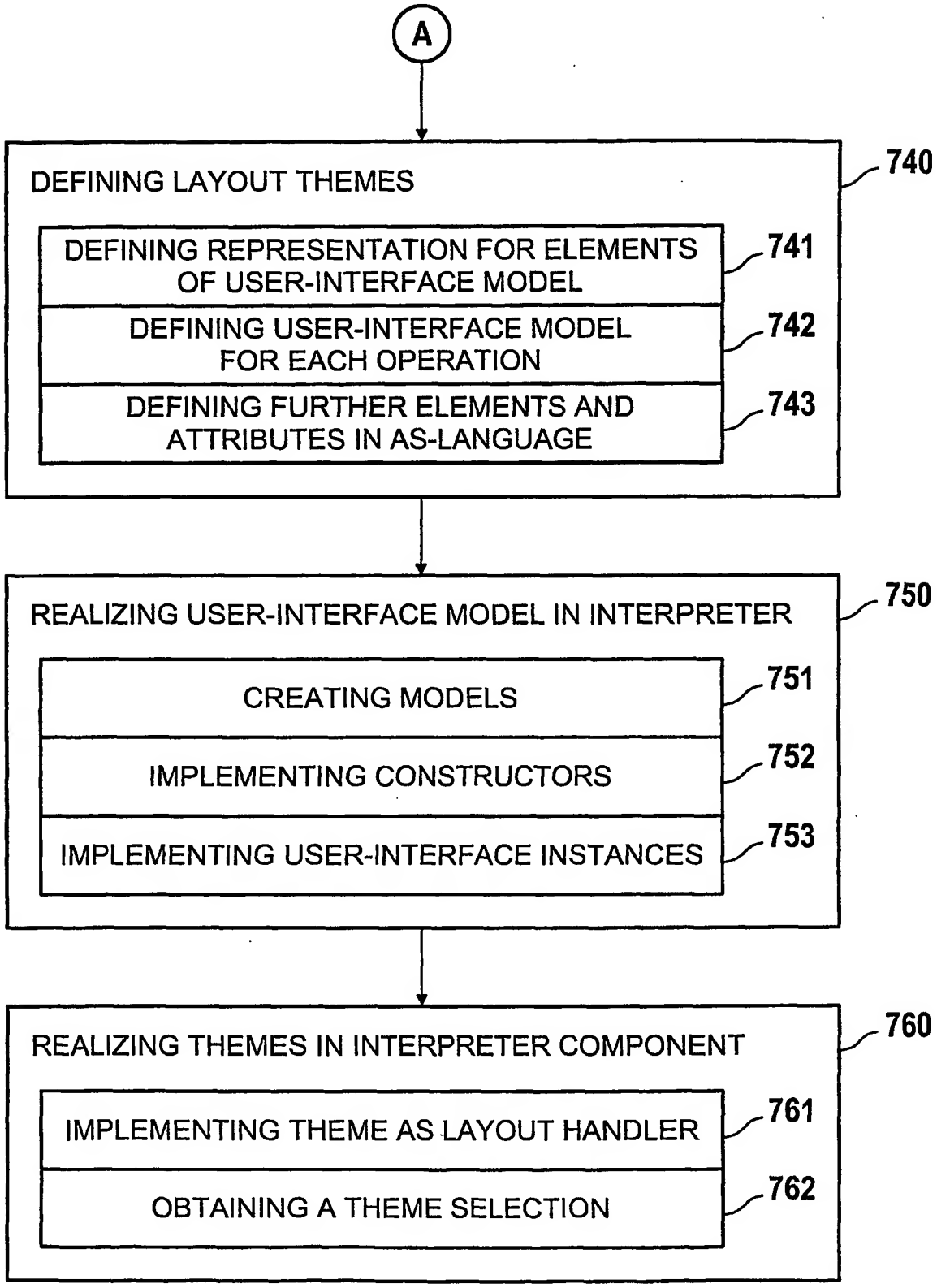
A
DEFINING LAYOUT THEMES
740
DEFINING REPRESENTATION FOR ELEMENTS OF USER-INTERFACE MODEL
741
DEFINING USER-INTERFACE MODEL FOR EACH OPERATION
742
DEFINING FURTHER ELEMENTS AND ATTRIBUTES IN AS-LANGUAGE
743
REALIZING USER-INTERFACE MODEL IN INTERPRETER
750
CREATING MODELS
751
IMPLEMENTING CONSTRUCTORS
752
IMPLEMENTING USER-INTERFACE INSTANCES
753
REALIZING THEMES IN INTERPRETER COMPONENT
760
IMPLEMENTING THEME AS LAYOUT HANDLER
761
OBTAINING A THEME SELECTION
762

FIG. 28

700